VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the Virginia Pollutant Discharge Elimination System (VPDES) permit listed below. This permit is being processed as a Major, Municipal Permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the operation of a publically owned wastewater treatment plant serving an approximate population of 71,300 users located within two cities and portions of three counties. This permit action consists of reissuing and updating the permit to reflect current VPDES policy and guidance. The limitations for Total Residual Chlorine and Ammonia (as N) have been revised. A new limitation for chronic Whole Effluent Toxicity has been incorporated into the permit.

1. Facility Name: South Central Wastewater Authority (SCWWA)

   Facility & Mailing Address: 900 Magazine Road
   Petersburg, Virginia 23803

2. Permit No. VA0025437 Existing Permit Expiration Date: 12/11/2011

3. Owner: South Central Wastewater Authority
   Owner Contact: L. Alan Harrison, P.E.
   Title: Assistant Executive Director
   Telephone No.: (804) 861-0111
   Email: aharrison@scwwa.org

4. Application Complete Date: 6/6/2011
   DEQ Regional Office: Piedmont Regional Office

Permit Drafted By:	Andrew Hammond	Date:	09/26/11, 10/13/11, 11/16/11 03/14/12, 03/16/12, 03/19/12 06/21/12, 06/28/12
Reviewed By:	Emilee Carpenter	Date:	10/05/11, 10/13/11, 06/22/12
	Ray Jenkins	Date:	11/10/11
	Curt Linderman	Date:	03/06/12, 03/15/12
	Kyle Winter	Date:	03/19/12
	Mike Murphy	Date:	03/21/12
	Allan Brockenbrough	Date:	03/22/12

5. Receiving Stream Name: Appomattox River
   River Mile: 2-APP010.91
   Basin: James River (Lower)
   Subbasin: Appomattox River
   Section: 5
   Class: II
   Special Standards: None

1-Day, 10-Year Low Flow (1Q10):	N/A	30-Day, 5-Year Low Flow (30Q5):	N/A
1-Day, 10-year High Flow:	N/A	30-Day, 10-Year Low Flow (30Q10):	N/A
1-Day, 30-year Low Flow (1Q30):	N/A	30-Day, 10-Year High Flow:	N/A
7-Day, 10-Year Low Flow (7Q10):	N/A	Harmonic Mean Flow (HM):	N/A
7-Day, 10-Year High Flow:	N/A		

Tidal? Yes On 303(d) list? Yes

See **Attachment A** for the flow frequency analysis memo. The memo establishes approximate freshwater inflows upstream of the facility's discharge point for wasteload allocation development. However, SCWWA discharges directly to the Appomattox River tidal freshwater estuary. As a result, previously established

tidal dilution ratios (see **Attachment G**) were utilized for 2012 wasteload allocation development. These dilution ratios were also utilized in the 2006 permit reissuance.

6. Operator License Requirements: Class I
The recommended attendance hours by a licensed operator and the minimum daily hours that the treatment works should be manned by operating staff are contained in the Sewage Collection and Treatment Regulations (SCAT) 9 VAC 25-790-300. A Class I operator is required for this facility.

7. Reliability Class: Class I
Reliability is a measurement of the ability of a component or system to perform its designated function without failure or interruption of service. The reliability classification is based on the water quality and public health consequences of a component or system failure. The permittee is required to maintain Class I reliability for this facility.

8. Permit Characterization:

( ) Private ( ) Federal ( ) State (**X**) POTW ( ) PVOTW

( ) Possible Interstate Effect ( ) Interim Limits in Other Document

9. See **Attachment B** for the existing and proposed upgraded facility flow diagrams.

Table 1. Discharge Description

Outfall Number	Discharge Source	Treatment	Design Flow
001	Industrial, Residential & Commercial	<u>Existing Facility</u> screening, grit removal, primary sedimentation, biological nutrient removal, activated sludge process, secondary clarification, chlorination, dechlorination, parshall flume, sludge belt presses, and lime stabilization of sewage sludge	23.00 MGD
		<u>Upgraded Facility</u> screening, grit removal, primary sedimentation, biological nutrient removal, activated sludge process, secondary clarification, chemical phosphorus removal, ultraviolet light disinfection, post aeration, parshall flume, cascade aeration, gravity belt thickeners, sludge rotary fan presses, and lime stabilization of sewage sludge	

10. Sewage Sludge Use or Disposal:
A review of the permittee's Sludge Management Plan (SMP) indicates that the facility's sewage sludge is consistent with Pollutant Concentration (PC) sewage sludge, using a Class B – Alternative 2 process to significantly reduce pathogens (Option 5 – Lime Stabilization), and Vector Attraction Reduction Option 6 (alkaline addition to raise pH under specified conditions).

Existing and proposed sludge management consists of removing the waste sludge from the process flow and dewatering it utilizing belt presses and rotary fan presses, respectively. The dewatered sludge is then mixed with lime and transported to a covered storage pad. Lime addition is utilized to raise the pH level of the mixture to 12 standard units or greater for 2 hours and to maintain the pH level of the mixture at 11.5 standard units or greater for an additional 22 hours. This process is used to significantly reduce pathogens and to

provide vector attraction reduction. After stabilization has occurred, the material is applied to agricultural lands by an independent contractor (currently Recyc Systems, Inc).

In the event of an emergency or if the covered storage pad is full, SCWWA is authorized (by a local Indirect Wastewater Discharge Permit) to dispose dewatered sewage sludge at the Hopewell Regional Wastewater Treatment Facility where it will be incinerated. The dewatered sludge is not lime stabilized prior to incineration.

11. Discharge Location Description: This facility discharges to the Appomattox River
Topographic Map Name: Petersburg, Virginia
Topographic Map Number: 069B

See **Attachment C** for topographic map.

12. Material Storage:
Sodium hydroxide used for influent odor control is stored on-site immediately adjacent to the primary treatment facility. The holding tank is located outside and is within a concrete containment area. Sodium hypochlorite (15%) utilized for disinfection is stored in the Chlorination Building. The building is equipped with a ventilation system and the holding tanks are located within a concrete containment area. Sump pumps located within the chlorination building can be used to return any spills to the treatment process. Sodium bisulfate used for dechlorination is stored in holding tanks in the Sodium Bisulfite Building. A sump pump located within the building can be used to return any spills to the treatment process. Alum utilized for phosphorus removal is stored on-site immediately adjacent to the Alum Building. The alum holding tanks are located outside and are within a concrete containment area. Polymer used for sewage sludge thickening is stored in holding tanks in the Solids Conditioning Building. The holding tanks are located within a concrete containment area. Lime utilized for sewage sludge solids stabilization is stored on-site in silos which are located under roof cover at the Alkaline Stabilization Facility. Stabilized solids are stored under roof cover on the Solids Storage Pad prior to disposal by a private contractor. Diesel fuel used for powering backup generators, etc. is stored on-site in double walled tanks.

13. Ambient Water Quality Information:
Water quality data from monitoring station 2-APP012.79 were used in this permit reissuance for pollutant limitation evaluations. Monitoring station 2-APP012.79 is located on the Appomattox River at the Route 36 bridge, approximately 1.9 miles upstream of the discharge.

See **Attachment A** for monitoring station 2-APP012.79 stream data.

14. Antidegradation Review & Comments:

Tier: 1 __**X**__ 2 _____ 3 _____

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The Richmond-Crater Water Quality Management Plan (RCWQMP) allocates $cBOD_5$, ammonia, and dissolved oxygen in order to maintain a minimum dissolved oxygen level of 5.0 mg/L in the tidal Appomattox River and upper tidal James River. Since this equates to the Water Quality Standard at the time that the plan was developed, the tidal Appomattox River is considered a Tier 1 water.

15. Site Inspection: Performed by: Mike Dare & Andrew Hammond
Date: March 16, 2011

See **Attachment D** for site inspection report.

16. Effluent Screening & Limitation Development:

See **Attachment E** for effluent data submitted on the monthly Discharge Monitoring Reports (DMRs).

See **Attachment F** for a summary of the water quality criteria monitoring data submitted with the permit reissuance application.

See **Attachment G** for the Stream Sanitation Analysis Memo.

If it is determined that a specific pollutant cited in the Virginia Water Quality Standards (9 VAC 25-260-5 et seq.) exists in a facility's effluent, a reasonable potential analysis is required in order to determine if the facility may violate Water Quality Standards (WQS). This evaluation begins by determining the maximum allowable pollutant concentrations that can be discharged by a specific facility which will maintain the acute and chronic criteria contained in the WQS within the receiving stream (called "wasteload allocations" or WLA's). The WLA's are calculated using a DEQ-created Excel spreadsheet deemed MSTRANTI, which requires inputs representing critical data for effluent and stream flows and quality. The STATS computer application is then utilized to determine if the identified pollutant has the potential to exceed either the acute or chronic WLA's on a long term basis by calculating the expected long-term effluent distribution of the facility, then comparing the 97th percentile of that distribution to the pollutant's lowest calculated wasteload allocation. If a limitation is needed, STATS will also calculate that limitation based on United States Environmental Protection Agency (EPA) guidelines for the control of toxic pollutants. Lastly, the expected value of the pollutant is compared to applicable human health water quality standards.

The freshwater aquatic life WQS for metals are expressed in the dissolved form with the exception of selenium. Therefore, total recoverable metals data are not used to establish permit limitations. The freshwater aquatic life WQS for selenium are expressed in the total recoverable form. Consequently, total recoverable selenium data are used to perform reasonable potential analyses.

See **Attachment H** for the evaluations of the pollutants of concern. Included in Attachment H are the MSTRANTI printouts and STATS analyses.

Table 2. Basis of Effluent Limitations

EFFLUENT CHARACTERISTICS	BASIS FOR LIMITS	DISCHARGE LIMITATIONS			
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM
001 – Flow	NA	NL	NA	NA	NL
002 – pH	1, 2	NA	NA	6.0 s.u.	9.0 s.u.
004 – Total Suspended Solids (TSS)	1	30 mg/L 2600 kg/d	45 mg/L 3900 kg/d	NA	NA
005 – Total Residual Chlorine (TRC)	2	0.016 mg/L	0.017 mg/L	NA	NA
007 – Dissolved Oxygen (DO)	2, 5	NA	NA	5.0 mg/L	NA
012 – Total Phosphorus (TP)	3	2.0 mg/L	NA	NA	NA
069 – Ammonia as N November – May	2	7.52 mg/L 655 kg/d	9.52 mg/L 829 kg/d	NA	NA
120 – *E. coli*	2, 4	126 N/100 mL	NA	NA	NA

EFFLUENT CHARACTERISTICS	BASIS FOR LIMITS	DISCHARGE LIMITATIONS			
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM
157 – Total Residual Chlorine (TRC) Chlorine Contact Tank	7	NA	NA	1.0 mg/L	NA
159 – Five Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	5	15 mg/L 1271 kg/d	22 mg/L 1906 kg/d	NA	NA
213 – Total Residual Chlorine (TRC) Chlorine Contact Tank Instantaneous Minimum	7	NA	NA	0.60 mg/L	NA
318 – Ammonia as N, June – October	2, 5	4.17 mg/L 363 kg/d	6.05 mg/L 527 kg/d	NA	NA
380 – Whole Effluent Toxicity (WET)	2	NA	NA	NA	3.8 TU_c
792 – Total Nitrogen (TN-AC) Calendar Year Average	6	5.0 mg/L	NA	NA	NA
794 – Total Phosphorus (TP-AC) Calendar Year Average	6	0.50 mg/L	NA	NA	NA
805 – Total Nitrogen (TN-YTD) Calendar Year-to-Date	6	NL	NA	NA	NA
806 – Total Phosphorus (TP-YTD) Calendar Year-to-Date	6	NL	NA	NA	NA

1. Federal Secondary Treatment Standards (40 CFR 133.102)
2. Water Quality Based Effluent Limitations
3. Best Engineering Judgment (BEJ)
4. Appomattox River Watershed Bacteria TMDL
5. Richmond-Crater Water Quality Management Plan (RCWQMP) – See **Attachment I**
6. Regulation for Nutrient Enriched Waters and Discharges within the Chesapeake Bay Watershed (9 VAC 25-40-70)
7. Sewage Collection and Treatment Regulations (9 VAC 25-790-750)

pH (002): A pH limitation of 6.0 to 9.0 standard units is assigned to all discharges into Class II Estuarine Waters in accordance with the Water Quality Standards (WQS), 9 VAC 25-260-50, and federal secondary treatment standards.

TSS (004): A monthly average TSS limitation of 30 mg/L and a weekly average TSS limitation of 45 mg/L has been included in the 2012 permit in accordance with federal secondary treatment standards. The TSS monitoring frequency has been established in accordance with the June 2003 Water Permit Managers (WPM) decisions/recommendations and remains unchanged in the 2012 permit. The quantification level (QL) for TSS has been established in accordance with the January 27, 2010 VPDES Permit Manual, Guidance Memorandum (GM) 10-2003.

TRC (005): In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 20 mg/L in order to statistically derive permit limitations. See STATS analysis in Attachment H. Also, the TRC monitoring frequency was updated in accordance with GM 10-2003 from once per day to once every two (2) hours, which resulted in effluent limitations more stringent than the 2006 permit limitations. The QL for total residual chlorine has been established in accordance GM 10-2003.

A schedule of compliance has not been included in the 2012 permit for TRC. A review of the facility's DMR data contained in Attachment E indicates that the facility is currently capable of meeting the new TRC limitations without treatment process modifications; therefore, a schedule of compliance is unwarranted. The

agency established QL for TRC is 0.10 mg/L, which is an order of magnitude greater than the 2006, 2010, and 2012 permit limitations. However, TRC is considered absent if monitoring results are less than the agency established QL (i.e. "<QL").

DO (007): The 2006 daily minimum DO limitation of 5.0 mg/L has been carried forward with no changes for this permit reissuance. The RCWQMP specifies a daily average minimum DO waste load allocation of 5.0 mg/L for SCWWA (formerly Petersburg Sewage Treatment Plant). The daily minimum DO concentration limit of 5.0 mg/L is expected to maintain compliance with the RCWQMP wasteload allocation.

TP (012): When the Nutrient Enriched Water (NEW) Policy was promulgated, facilities discharging to NEW-designated waters with design flows greater than or equal to 1.0 MGD were assigned a monthly average total phosphorus limitation of 2.0 mg/L and a corresponding loading. The NEW-designation for the receiving stream, Appomattox River, has since been repealed. However, due to anti-backsliding the 2.0 mg/L TP limitation remains in the 2012 permit. The TP concentration limitation has been expressed to 2 significant figures in accordance with GM 06-2016.

The total phosphorus loading limitation contained in the 2006 permit has been superseded by the facility's TP loading limitation contained in the Water Quality Management Planning Regulation, 9 VAC 25-720-60, effective 1/1/2011. Therefore, in accordance with GM 07-2008, Amendment No. 2, the 2006 TP loading limitation has been removed from the permit.

Since this facility is currently registered for coverage under the Nutrient (Watershed) General Permit, 9 VAC 25-820-10 et seq., the TP monitoring and reporting requirements have been reduced from once per week to twice per month in accordance with current agency guidance.

E-Coli (120): All sewage discharges must be disinfected to achieve applicable bacterial concentrations in accordance with the WQS, 9 VAC 25-260-170. *E-Coli* are the bacterial indicator for sewage effluents discharging to freshwater. In addition, the wastewater treatment plant received an *E. coli* wasteload allocation of 4.01E+13 CFU/year based on an effluent concentration of 126 N/100 mL and a design flow of 23.00 MGD in the Appomattox River Watershed Bacteria total maximum daily load (TMDL) approved by EPA. Consequently, an *E. coli* limitation of 126 N/100 mL, applied as a monthly geometric mean, has been included in the 2012 permit. The monitoring frequency has been updated in accordance with GM 10-2003.

TRC Contact Tank (157) & TRC Contact Tank – Instantaneous Minimum (213): Chlorine contact tank TRC limitations (contained in Part I.B) have been established in accordance with the Sewage Collection and Treatment Regulations (9 VAC 25-790-750) and the 2010 VPDES Permit Manual, GM 10-2003. It is noted that these limitations are not applicable to the facility's final effluent. Monitoring frequencies and the quantification limit for chlorine contact tank TRC have been established in accordance with GM 10-2003.

$cBOD_5$ (159): The RCWQMP allocates 2,802 lb/d (1,271 kg/d) of $cBOD_5$ to SCWWA with a corresponding monthly average concentration of 22.4 mg/L at a design flow of 15.00 MGD. However, the facility previously expanded its design flow to 23.00 MGD. Therefore, a monthly average concentration of 15 mg/L at a design flow of 23.00 MGD has been established for this facility, which corresponds to a $cBOD_5$ wasteload allocation of 2,802 lb/d (1,271 kg/d). Historically, weekly average concentrations and/or loadings have been established for conventional municipal effluents by multiplying the respective monthly average concentration and/or loading by 1.5 (150%). A weekly average $cBOD_5$ wasteload allocation was established by multiplying the RCWQMP allocation of 2,802 lb/d by 1.5, which results in an allocation of 4,203 lb/d (1,906 kg/d). This weekly average loading equates to a weekly average effluent concentration of 22 mg/L at a design flow of 23.00 MGD. Effluent concentration limitations have been expressed in two (2) significant figures in accordance with GM 06-2016, whereas effluent loading limitations have been expressed in four (4) significant figures as originally established in the RCWQMP. The QL for $cBOD_5$ has been established in accordance with the recently adopted VPDES General Permit regulations.

The $cBOD_5$ monitoring frequency for the existing facility has been established in accordance with Section MN-2 of GM 10-2003; see **Attachment L**. Typically, upgraded facilities should generate at least 3 years of

effluent data before consideration of reduced effluent monitoring. However, it is anticipated that this facility's upgrade (i.e. installation of nutrient removal technology) will indirectly improve overall facility performance. Consequently, the $cBOD_5$ reduced monitoring frequency has also been applied to the upgraded facility.

Chronic WET (380): The 2006 permit required the permittee to perform yearly chronic WET testing for Outfall 001 using *Ceriodaphina dubia* and *Pimephales promelas*. The facility's effluent met the 2006 WET testing special condition endpoint of chronic NOEC equal to or greater than 27% (TU_c less than or equal to 3.7) in 100% of the tests conducted between 2007 and 2011. However, the reasonable potential analysis for *Pimephales promelas* indicated the need for a permit limitation based upon chronic toxicity. Consequently, a chronic WET limitation of 3.8 TU_c (chronic toxicity units) has been included in the 2012 permit. See **Attachment J** for the Whole Effluent Toxicity memo.

A schedule of compliance has been included in the 2012 permit and therefore, provides the permittee with an opportunity to perform a toxicity reduction evaluation (i.e. time to identify and eliminate potential sources of toxicity) prior to the limitation becoming effective.

DEQ staff recommends the following dilution series for chronic whole effluent toxicity testing:

% Effluent	TU_c
100.0	1.00
52.0	1.92
27.0	3.70
14.0	7.13
7.3	13.72

Ammonia as N [Nov – May] (069) & Ammonia as N [Jun – Oct] (318): The RCWQMP allocates 801 lb/d (363 kg/d) of ammonia as nitrogen to SCWWA from June 1st to October 31st (summer seasonal tier) with a corresponding monthly average of 6.4 mg/L at a design flow of 15.00 MGD in order to maintain a monthly average minimum dissolved oxygen level of 5.0 mg/L in the tidal Appomattox River. In addition, the RCWQMP allocates 2,028 lb/d (920 kg/d) of ammonia as nitrogen to the facility from November 1st to May 1st (winter seasonal tier) with a corresponding monthly average of 16.2 mg/L at a design flow of 15.00 MGD. However, the facility previously expanded its design flow to 23.00 MGD. Therefore, a monthly average concentration of 4.17 mg/L (6.26 mg/L weekly average) at a design flow of 23.00 MGD has been established for this facility from June 1st to October 31st and a monthly average concentration of 10.6 mg/L (15.9 mg/L weekly average) has been established from November 1st to May 31st. See Table 3 below for a summary of the RCWQMP wasteload allocations.

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 9.00 mg/L in order to force permit limitations for each seasonal tier. See Table 3 below for a summary of these analyses and Attachment H for the MSTRANTI printouts and STATS analyses. The 2006 permit limitations have also been provided in Table 3 and Attachment H.

Table 3. Ammonia (as N) Limitation Evaluation

SEASONAL TIER	RCWQMP		2012 MSTRANTI / STATS		2006 PERMIT LIMITATIONS	
Annual (Summer)	June 1 – October 31		June 1 – October 31		June 1 – October 31	
	4.17 mg/L 363 kg/d	6.26 mg/L 545 kg/d	4.78 mg/L 416 kg/d	6.05 mg/L 527 kg/d	4.17 mg/L 363 kg/d	6.26 mg/L 545 kg/d
Wet (Winter)	November 1 – May 31		November 1 – May 31		November 1 – May 31	
	10.6 mg/L 920 kg/d	15.9 mg/L 1,380 kg/d	7.52 mg/L 655 kg/d	9.52 mg/L 829 kg/d	7.70 mg/L 670 kg/d	10.33 mg/L 900 kg/d

The 2012 permit includes an annual (summer) monthly average ammonia (as N) limitation of 4.17 mg/L (363 kg/d) in accordance with the RCWQMP. An annual (summer) weekly average ammonia (as N) limitation of 6.05 mg/L (527 kg/d) has been established with MSTRANTI and STATS due to potential in-stream toxicity. This is a change from the 2006 permit. This 2012 permit includes a wet (winter) monthly average ammonia (as N) limitation of 7.52 mg/L (655 kg/d) and a winter weekly average ammonia (as N) limitation of 9.52 mg/L (829 kg/d), which were established with MSTRANTI and STATS. This is also a change from the 2006 permit. The ammonia (as N) concentration and loading limitations have been expressed to 3 significant figures in accordance with GM 06-2016 and the underlying standard. The QL for ammonia (as N) has been established in accordance GM 10-2003.

A schedule of compliance has not been included in the 2012 permit for ammonia (as N). A review of the facility's DMR data contained in Attachment E indicates that the facility is currently capable of meeting the new ammonia (as N) limitations without treatment process modifications; therefore, a schedule of compliance is unwarranted.

The ammonia (as N) monitoring frequency for the existing facility has been established in accordance with Section MN-2 of GM 10-2003; see **Attachment L**. Typically, upgraded facilities should generate at least 3 years of effluent data before consideration of reduced effluent monitoring. However, it is anticipated that this facility's upgrade (i.e. installation of nutrient removal technology) will indirectly improve overall facility performance. Consequently, the ammonia (as N) reduced monitoring frequency has also been applied to the upgraded facility.

TN-AC (792), TP-AC (794), TN-YTD (805), TP-YTD (806): According to 9 VAC 25-40-70.A, the State Water Control Board shall include technology-based effluent concentration limits based on the technology installed. GM 07-2008, Amendment No. 2 indicates that these limits should be inserted into the permit upon issuance of a certificate-to-construct (CTC) and become effective January 1st following the issuance of a certificate-to-operate (CTO) for the installed nutrient removal technology. The permittee was issued a certificate-to-construct (CTC) for the installation of nutrient removal technology on 8/20/2009 (PTL # 24374). The CTC indicates that the facility upgrade is designed to comply with an annual average total nitrogen concentration of 5.0 mg/L and an annual average total phosphorus concentration of 0.50 mg/L. Consequently, technology-based effluent concentration limits have been included in the 2012 permit and will become effective January 1st following the issuance of a CTO for the installed nutrient removal technology. These limitations were also included in the 2010 permit modification. At the time in which these limitations become effective, the NEW concentration limit of 2.0 mg/L for Total Phosphorus will be superseded. Since the technology-based effluent concentration limit of 0.50 mg/L is more stringent that the NEW effluent concentration limit of 2.0 mg/L, anti-backsliding is not a concern.

Other Parameters: The permittee reported a detectable concentration for dissolved barium. However, freshwater aquatic life WQS do not exist for this parameter. Barium was compared to the human health – public water supply criterion (an all other surface waters criterion and/or WLA does not exist for this parameter) from the WQS. See Table 4 below. The maximum reported concentration is less than the criterion.

The permittee reported detectable concentrations for dissolved copper. An aquatic toxicity reasonable potential analysis was performed and permit limitations are not needed; see Attachment H. In addition, copper was compared to the human health – public water supply criterion (an all other surface waters criterion and/or WLA does not exist for this parameter) from the WQS. See Table 4 below. The maximum reported concentration is less than the criterion.

The permittee reported censored concentrations for dissolved iron greater than the agency established minimum QL (1.0 µg/L). However, freshwater aquatic life WQS do not exist for this parameter. Iron was compared to the human health – public water supply criterion (an all other surface waters criterion and/or WLA does not exist for this parameter) from the WQS. See Table 4 below. The maximum reported concentration is less than the criterion.

The permittee reported detectable concentrations for dissolved manganese. However, freshwater aquatic life WQS do not exist for this parameter. Manganese was compared to the human health – public water supply criterion (an all other surface waters criterion and/or WLA does not exist for this parameter) from the WQS. See Table 4 below. The maximum reported concentration is less than the criterion.

The permittee reported a detectable concentration for dissolved mercury. An aquatic toxicity reasonable potential analysis was performed and permit limitations are not needed; see Attachment H. A human health criterion does not exist for this parameter.

The permittee reported detectable concentrations for dissolved zinc. An aquatic toxicity reasonable potential analysis was performed and permit limitations are not needed; see Attachment H. In addition, zinc was compared to the human health – all other surface waters WLA from MSTRANTI and permit limitations are not necessary. See Table 4 below.

The permittee reported detectable concentrations for bromoform. However, freshwater aquatic life WQS do not exist for this parameter. Bromoform was compared to the human health – all other surface waters WLA from MSTRANTI and permit limitations are not needed; see Attachment H. See Table 4 below.

The permittee reported detectable concentrations for chlorodibromomethane. However, freshwater aquatic life WQS do not exist for this parameter. Chlorodibromomethane was compared to the human health – all other surface waters WLA from MSTRANTI and permit limitations are not needed. See Table 4 below.

The permittee reported detectable concentrations for chloride. An aquatic toxicity reasonable potential analysis was performed and permit limitations are not needed; see Attachment H. In addition, chloride was compared to the human health – public water supply criterion (an all other surface waters criterion and/or WLA does not exist for this parameter) from the WQS. See Table 4 below. The maximum reported concentration is less than the criterion.

The permittee reported a detectable concentration for chloroform. However, freshwater aquatic life WQS do not exist for this parameter. Chloroform was compared to the human health – all other surface waters WLA from MSTRANTI and permit limitations are not needed; see Attachment H. See Table 4 below.

The permittee reported detectable concentrations (9.44 pCi/L and 5.93 pCi/L) for Beta Particle & Photon Activity. It is noted that the Beta Particle & Photon Activity data reported is expressed in units of concentration (pCi/L) whereas the human health – public water supply criterion,4 mrem/yr, is expressed in units of exposure. Virginia's Waterworks Regulations, 12VAC5-590-10 et seq., establish a primary maximum contaminant level (PCML) of 4 mrem/yr for Beta Particle & Photon Activity. The Waterworks Regulations also state, "When the detected level of beta/photon emitters has been reported in units of pCi/L and does not exceed 50 pCi/L, the [consumer confidence] report may list the PMCL [primary maximum contaminant level] as 50 pCi/L. EPA considers 50 pCi/L to be the level of concern for beta particles." Since the reported Beta Particle & Photon Activity data is in compliance with the Waterworks Regulations, these radionuclides are believed present at non-problematic concentrations for this evaluation.

The permittee reported detectable concentrations for nitrate (as N), sulfate, and total dissolved solids (TDS). However freshwater aquatic life WQS do not exist for these parameters. These parameters were compared to their respective human health – public water supply criterion (an all other surface waters criterion and/or WLA do not exist for these parameters) from the WQS. See Table 4 below. The maximum reported concentrations are less than their respective criterion.

Table 4. Human Health Comparison and/or Evaluation

PARAMETER	MAX REPORTED CONCENTRATION	HUMAN HEALTH WLA	PERMIT LIMITATIONS NEEDED?
Dissolved Barium	15 µg/L	2,000 µg/L (1)	-----
Dissolved Copper	7 µg/L	1,300 µg/L (1)	-----
Dissolved Iron	<100 µg/L	300 µg/L (1)	-----
Dissolved Manganese	29 µg/L	50 µg/L (1)	-----
Dissolved Zinc	39 µg/L	68,000 µg/L	NO
Bromoform	83.9 µg/L	3,600 µg/L	NO
Chloride	83,000 µg/L	250,000 µg/L (1)	-----
Chlorodibromomethane	17.8 µg/L	340 µg/L	NO
Chloroform	16.8 µg/L	29,000 µg/L	NO
Nitrate (as N)	14.0 µg/L	10,000 µg/L (1)	-----
Sulfate	37.2 µg/L	250,000 µg/L (1)	-----
Total Dissolved Solids	343 µg/L	500,000 µg/L (1)	-----

(1) Human health – public water supply criterion which is not applicable to the facility's receiving stream. Comparison between the maximum reported detectable concentration and the human health criterion performed for informational purposes only.

All other parameters were reported below DEQ required quantification levels and therefore, considered absent for the purposes of this evaluation.

17. Basis for Sludge Use & Disposal Requirements:

Table 5. Basis of Sewage Sludge Limitations

SLUDGE CHARACTERISTICS	BASIS FOR LIMITS	LIMITATIONS	
		MONTHLY AVERAGE [mg/kg]	CEILING CONCENTRATION MAXMIUM [mg/kg]
Percent Solids	2	NL	NA
Total Arsenic	1	41	75
Total Cadmium	1	39	85
Total Copper	1	1500	4300
Total Lead	1	300	840
Total Mercury	1	17	57
Total Molybdenum	1	NA	75
Total Nickel	1	420	420
Total Selenium	1	100	100

SLUDGE CHARACTERISTICS	BASIS FOR LIMITS	LIMITATIONS	
		MONTHLY AVERAGE [mg/kg]	CEILING CONCENTRATION MAXMIUM [mg/kg]
Total Zinc	1	2800	7500

1. VPDES Permit Regulation (9 VAC 25-31-540)
2. Best Engineering Judgment (BEJ)

As noted in Item 10 above, the facility's sewage sludge is consistent with Pollutant Concentration (PC) sewage sludge, using a Class B – Alternative 2 process to significantly reduce pathogens (Option 5 – Lime Stabilization), and Vector Attraction Reduction Option 6 (alkaline addition to raise pH under specified conditions). The permittee utilizes an independent contractor (currently Recyc Systems, Inc.) to land apply sewage sludge generated at the facility. However, the permittee is responsible for all recordkeeping, pathogen reduction, vector attraction reduction, pollutant limitations, and reporting requirements associated with PC Class B – Alternative 2 sewage sludge. Consequently, monthly average and ceiling pollutant concentrations have been included in the 2012 permit in accordance with 9 VAC 25-31-540.

The permittee indicated that the facility generates 3,346 dry metric tons of sewage sludge during a 365-day period. Since this quantity is equal to or greater than 1,500 dry metric tons but less than 15,000 dry metric tons, sewage sludge monitoring and reporting is required once per 60 days (once per 2 months) in accordance with 9 VAC 25-31-570.

18. Anti-backsliding Statement:
All limitations in the proposed permit are the same or more stringent than the limitations in the 2010 permit modification.

19. Compliance Schedules:
VPDES Permit Regulation, 9 VAC 25-31-250, allows for schedules of compliance which will lead to compliance with the Clean Water Act, the State Water Control Law, and regulations promulgated under them. Therefore, a 4-year schedule of compliance has been provided in the 2012 permit for the new chronic WET limitation. This schedule will provide the permittee with an opportunity to perform a toxicity reduction evaluation prior to the limitation becoming effective. A review of the facility's effluent DMR data (included in Attachment E) indicates that the facility is currently capable of meeting the new TRC and ammonia (as N) limitations without further treatment and/or WWTP modifications. Consequently, a schedule of compliance has not been included in the 2012 permit for these effluent parameters. See Item 16 of this fact sheet for additional information.

20. Special Conditions:

a. Part I.B – Additional Total Residual Chlorine Limitations and Monitoring Requirements
Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 and Virginia Water Quality Standards 9 VAC 25-260-170, Bacteria; other recreational waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

b. Part I.C.1 – 95% Capacity Reopener
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B.4 for all POTW and PVOTW permits.

c. Part I.C.2 – Indirect Dischargers
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

d. Part I.C.3 – CTC, CTO Requirement
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.

e. Part I.C.4 – O&M Manual Requirement
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190 E.

f. Part I.C.5 – Materials Handling/Storage
Rationale: 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and § 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

g. Part I.C.6 – Licensed Operator Requirement
Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C and the Code of Virginia § 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals, 18 VAC 160-20-10 et seq., require licensure of operators.

h. Part I.C.7 – Reliability Class
Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

i. Part I.C.8 – Reopeners
Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

j. Part I.C.9 – Compliance Reporting
Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J.4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

k. Part I.C.10 – Nutrient Reporting Calculations
Rationale: § 62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

l. Part I.C.11 – Suspension of Concentration Limits for E3/E4 Facilities
Rationale: 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

m. Part I.C.12 – Closure Plan
Rationale: Code of Virginia § 62.1-44.19 of the State Water Control Law. This condition establishes the requirement to submit a closure plan for the wastewater treatment facility if the treatment facility is being replaced or is expected to close.

n. Part I.D – Pretreatment Program
Rationale: VPDES Permit Regulation, 9 VAC 25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulations.

o. Part I.E – Whole Effluent Toxicity Limitations and Monitoring Requirements
Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act.

p. Part I.F – Sewage Sludge Limitations and Monitoring Requirements
Rationale: VPDES Permit Regulation (9 VAC 25-31-10 et. seq.), Part VI – Subpart B.

q. Part I.G.1 – Sludge Reopener
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage.

r. Part I.G.2 – Sludge Use and Disposal
Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B.2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

s. Part I.G.3 – Recordkeeping Special Conditions for Land Application of Sewage Sludge
Rationale: VPDES Permit Regulation, 9 VAC 25-31-580, requires permittees who prepare sewage sludge to develop records as well as retain those records for a minimum of five (5) years.

t. Part I.G.4 – Reporting Requirements for Land Application of Sewage Sludge
Rationale: VPDES Permit Regulation, 9 VAC 25-31-590, requires permittees to submit sewage sludge records to the department no later than February 19th of each year for the previous calendar year's activities.

u. Part I.H – Schedule of Compliance
Rationale: 9 VAC 25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law, and regulations promulgated under them. See Items 16 and 19 of this fact sheet for additional information.

v. Part II – Conditions Applicable to All VPDES Permits
Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes to the Permit (2010 Permit Modification):

Permit Cover Page Changes:					
Item			**Rationale**		
Facility Name			Updated to reflect application, EPA Form 2A.		
Facility Location			Included state and zip code for Petersburg as provided in application, EPA Form 2A.		
Part I.A Changes:					
Parameter Changed	**Discharge Limitations Changed**		**Monitoring Requirements Changed**		**Rationale**
	From	**To**	**From**	**To**	
TRC	0.018 mg/L 0.022 mg/L	0.016 mg/L 0.017 mg/L	1 per Day	1 per 2 Hours	Permit limitations revised due to updated reasonable potential analysis. Monitoring frequency revised in accordance with GM 10-2003.
TP	2.00 mg/L 174 kg/d	2.0 mg/L	1 per Week	2 per Month	Permit concentration limit revised to be expressed in the desired number of significant figures per GM 06-2016. Permit loading limitation removed in accordance with GM 07-2008 Amendment No. 2. Monitoring frequency reduced in accordance with current agency guidance.
Ammonia as N Nov – May	7.70 mg/L 670 kg/d 10.33 mg/L 900 kg/d	7.52 mg/L 655 kg/d 9.52 mg/L 829 kg/d	3 Days per Week	5 Days per Week	Monthly average and weekly average permit limitations revised due to reasonable potential analysis. Monitoring frequency for existing facility increased to baseline established in 2006 permit. Monitoring frequency for upgraded facility established in accordance with GM 10-2003. See Item 16 of this fact sheet.
E. coli	No change		5 Days per Week	4 per Month (10 am – 4 pm)	Monitoring frequency revised in accordance with GM 10-2003.
$cBOD_5$	No change		3 Days per Week	5 Days per Week	Monitoring frequency for existing facility increased to baseline established in 2006 permit. Monitoring frequency for upgraded facility established in accordance with GM 10-2003. See Item 16 of this fact sheet.
Ammonia as N Jun – Oct	No change 6.26 mg/L 545 kg/d	6.05 mg/L 527 kg/d	3 Days per Week	5 Days per Week	Monthly Average permit limitations remain unchanged in the 2012 permit. Weekly Average permit limitations revised due to reasonable potential analysis. Monitoring frequency for existing facility increased to baseline established in 2006 permit; see Item 16 of this fact sheet.
Chronic Whole Effluent Toxicity	-----	3.8 TU_c Max.	-----	1 per Quarter	Permit limitation established due to reasonable potential analysis. See Item 16 and Attachment J of this fact sheet.

TN-AC TP-AC TN-YTD TP-YTD	No change	No change	Technology-based TN and TP effluent concentration limitations have been included in the 2012 permit and will become effective January 1st following the issuance of a CTO for the installed nutrient removal technology. These limitations were also included in the 2010 permit modification
From	**To**	**Rationale**	
I.A.1.a	I.A.1.a	Updated definitional language for "NL" and "NA." Added definitional language for "24 HC."	
I.A.1.a(1)	I.A.1.a(1)	No change.	
I.A.1.a(2)	I.A.1.a(2)	Updated language for clarity purposes. Removed reference for compliance reporting special condition.	
I.A.1.a(3)	I.A.1.a(3)	Updated language for clarity purposes.	
I.A.1.a(4)	Removed	Footnote removed since reduced monitoring has been removed from the permit.	
I.A.1.a(5)	I.A.1.a(4)	Renumbered. No change.	
I.A.1.a(6)	I.A.1.a(5)	Renumbered. No change.	
-----	I.A.1.a(6)	New. Added footnote for clarity purposes.	
-----	I.A.1.a(7)	New. Added footnote for clarity purposes.	
I.A.1.b	I.A.1.b	No change.	
I.A.1.c	I.A.1.c	No change.	
-----	I.A.1.d	New. Added in accordance with federal secondary treatment standards.	
I.A.2.a	I.A.2.a	Updated definitional language for "NL" and "NA." Added definitional language for "24 HC."	
I.A.2.a(1)	I.A.2.a(1)	No change.	
I.A.2.a(2)	I.A.2.a(2)	Updated language for clarity purposes. Removed reference for compliance reporting special condition.	
I.A.2.a(3)	I.A.2.a(3)	Updated language for clarity purposes.	
I.A.2.a(4)	Removed	Footnote removed since reduced monitoring has been removed from the permit.	
I.A.2.a(5)	I.A.2.a(4)	Renumbered. No change.	
I.A.2.a(6)	I.A.2.a(5)	Renumbered. No change.	
I.A.2.a(7)	I.A.2.a(6)	Renumbered. Updated special condition references for nutrient reporting requirements.	
-----	I.A.2.a(7)	New. Added footnote for clarity purposes.	
-----	I.A.2.a(8)	New. Added footnote for clarity purposes.	
I.A.2.b	I.A.2.b	No change.	
I.A.2.c	I.A.2.c	No change.	
-----	I.A.2.d	New. Added in accordance with federal secondary treatment standards.	
Additional TRC Limitations and Monitoring Requirements Changes:			
From	**To**	**Rationale**	
I.B.1	I.B.1	No change.	
I.B.2	I.B.2	Updated language for clarity purposes.	
I.B.3	I.B.3	Updated language for clarity purposes.	
I.B.4	I.B.4	Second portion of this condition relocated to Part I.B.5.	
I.B.4	I.B.5	Second portion of this condition relocated to Part I.B.5. Included reference to *E. coli* requirements delineated elsewhere in Part I.	
Special Condition Changes:			
From	**To**	**Rationale**	
I.C.1	I.C.1	Piedmont Regional Office address removed.	

I.C.2	I.C.2	No change.
I.C.3	I.C.3	Updated language to reflect GM 10-2003 and Water Permit Managers (WPM) discussions subsequent to the release of GM 07-2008, Amendment No. 2.
I.C.4	I.C.4	Updated language to reflect GM 10-2003.
I.C.5	I.C.5	Updated language to reflect GM 10-2003.
I.C.6	I.C.6	Updated language to reflect name change of wastewater works operators licensing board.
I.C.7	I.C.7	No change.
I.C.8 & I.C.9	I.C.8	Incorporated language from Part I.C.8 and Part I.C.9 into one special condition.
I.C.10	I.C.9	Updated language to reflect GM 10-2003. Updated QL for $cBOD_5$. Removed QLs for total nitrogen and total phosphorus.
I.C.11	Removed	Special condition removed since reduced monitoring has been removed from the permit.
I.C.12	I.C.10	Renumbered. Updated language for clarity purposes.
I.C.13	I.C.11	Renumbered. No change.
-----	I.C.12	New. Added special condition in accordance with DEQ-PRO staff decisions dated 1/27/2009 and 3/31/2009.
Pretreatment Program Changes:		
From	**To**	**Rationale**
I.D	I.D	Updated language to reflect GM 10-2003. Language further revised according to regional procedure.
Whole Effluent Toxicity Limitations and Monitoring Requirements Changes:		
From	**To**	**Rationale**
I.E	I.E	Updated language to reflect Whole Effluent Toxicity memorandum. See Item 16 and Attachment J of this fact sheet.
Sewage Sludge Limitations and Monitoring Requirements Changes:		
From	**To**	**Rationale**
I.F.1	I.F.1	Updated language to reflect GM 10-2003.
I.F.2	I.F.2	Updated reference to DMR SO1 for clarity purposes.
I.F.3	I.F.3	Updated language to reflect GM 10-2003.
I.F.4	I.F.4	Updated language to reflect GM 10-2003.
I.F.5	I.F.5	No change.
I.F.2(b)	Removed	Footnote removed for clarity purposes.
Additional Sewage Sludge Requirements or Special Conditions Changes:		
From	**To**	**Rationale**
I.G.1	I.G.1	No change.
I.G.2	I.G.2	Updated language to reflect GM 10-2003.
I.G.3	I.G.3	Updated language to reflect GM 10-2003.
I.G.4	I.G.4	New. Added special condition in accordance with GM 10-2003.
Part II Changes:		
From	**To**	**Rationale**
-----	II.A.4	New condition added to reflect change in laboratory accreditation requirements.

Changes to the 2012 Draft Permit in Response to Owner Comments:					
Part I.A Changes:					
Parameter Changed	**Discharge Limitations Changed**		**Monitoring Requirements Changed**		**Rationale**
	From	**To**	**From**	**To**	
Ammonia as N Nov – May	No change		5 Days per Week	1 Day per Week	Performed reduced monitoring evaluation in response to owner comments. Monitoring frequency reduced as a result of this evaluation; see Attachment L.
Ammonia as N Jun – Oct	No change		5 Days per Week	1 Day per Week	Performed reduced monitoring evaluation in response to owner comments. Monitoring frequency reduced as a result of this evaluation; see Attachment L.
$cBOD_5$	No change		5 Days per Week	2 Days per Week	Performed reduced monitoring evaluation in response to owner comments. Monitoring frequency reduced as a result of this evaluation; see Attachment L.
From	**To**		**Rationale**		
-----	I.A.1.a(8)		New. Added footnote for clarity purposes.		
-----	I.A.1.a(9)		New. Added footnote for clarity purposes.		
-----	I.A.2.a(9)		New. Added footnote for clarity purposes.		
-----	I.A.2.a(10)		New. Added footnote for clarity purposes.		
Special Condition Changes:					
From	**To**		**Rationale**		
-----	I.B.13		New. Added special condition in accordance with GM 10-2003 as a result of reduced monitoring evaluation.		
Whole Effluent Toxicity Limitations and Monitoring Requirements Changes:					
From	**To**		**Rationale**		
I.E.1	I.E.1		Updated language to reflect Whole Effluent Toxicity memorandum which was revised in response to owner comments.		
I.E.2	I.E.2		Updated language to reflect Whole Effluent Toxicity memorandum which was revised in response to owner comments.		
Schedule of Compliance Changes:					
From	**To**		**Rationale**		
-----	I.H.1 – 3		New. Added schedule of compliance for the new chronic whole effluent toxicity limitation in response to owner comments.		

22. Variances/Alternate Limits or Conditions: None

23. Regulation of Users - 9 VAC 25-31-280 B.9: Not applicable

24. Public Notice Information required by 9 VAC 25-31-280 B:

Comment Period:	Start Date:	To be determined
	End Date:	To be determined
	Published Dates:	To be determined
	Publishing Newspaper:	*The Progress-Index*

All pertinent information is on file and may be inspected or copied by contacting Emilee Adamson at:

Virginia Department of Environmental Quality (DEQ)
Piedmont Regional Office
4949-A Cox Road
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DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit. The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment or may request copies of the documents from the contact person listed above.

Public Notice Comments: To be determined

25. 303(d) Listed Segments (TMDL):
This facility discharges directly to the Appomattox River in the Chesapeake Bay watershed in the Appomattox River Tidal Freshwater Estuary (APPTF) segment. The receiving stream has been addressed in the Chesapeake Bay TMDL, approved by EPA on December 29, 2010. The TMDL addresses dissolved oxygen (DO), chlorophyll a, and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source waste load allocations (WLAs) for Total Nitrogen (TN), Total Phosphorus (TP) and Total Suspended Solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185. This facility is considered a Significant Chesapeake Bay wastewater discharge. All Significant Chesapeake Bay wastewater discharges in the Appomattox River Tidal Freshwater Estuary (APPTF) segment have been assigned aggregate WLAs of 217,818.92 pounds per year TN, 7,410.00 pounds per year TP, and 2,017,573.76 pounds per year TSS.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP), approved by EPA on December 29, 2010. The approved WIP recognizes that the TMDL nutrient WLAs for Significant Chesapeake Bay wastewater dischargers are set in two regulations: 1) the Water Quality Management Planning Regulation (9VAC25-720); and 2) the "General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia" (9VAC25-820). The WIP further outlines that since TSS discharges from wastewater facilities represent an insignificant portion of the Bay's total sediment load, they may be considered in the

aggregate. The WIP also states that wastewater discharges with technology-based TSS limits are considered consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. DEQ has provided coverage under the VPDES Nutrient General Permit (GP) for this facility under permit VAN040087. The requirements of the Nutrient GP currently in effect for this facility are consistent with the Chesapeake Bay TMDL. This individual permit includes technology-based TSS limits of 30 mg/L that are also consistent with the Chesapeake Bay TMDL and WIP. In addition, the individual permit has limits of 15 mg/L ($cBOD_5$), 4.17 mg/L (ammonia as nitrogen – summer seasonal tier), 7.52 mg/L (ammonia as nitrogen – winter seasonal tier), and 5.0 mg/L (DO), which provide protection of in-stream DO concentrations to at least 5.0 mg/L. However, implementation of the full Chesapeake Bay WIP, including GP reductions combined with actions proposed in other source sectors, is expected to adequately address ambient conditions such that the proposed effluent limits of this individual permit are consistent with the Chesapeake Bay TMDL, and will not cause an impairment or observed violation of the standards for DO, chlorophyll a, or SAV as required by 9VAC25-260-185.

The Appomattox River Tidal Freshwater Estuary (APPTF) segment is also listed as impaired for not supporting the Fish Consumption Use. The Virginia Department of Health has issued an advisory for PCBs in fish tissue. A TMDL has not been approved for this segment. In support of the preparation of the Upper James River PCB TMDL, the permittee performed voluntary low-level PCB monitoring and reported a maximum effluent PCB concentration of 0.0020 µg/L as compared to a human health – all other surface waters criterion of 0.00064 µg/L. The TMDL that will be prepared for this segment may have a WLA for this discharge for PCBs. As permissible under 40 CFR Part 122.44(k)(3) and (4), effluent PCB loadings in excess of the facility's potential WLA will be mitigated through the application of best management practices specified in a Pollution Minimization Plan in lieu of numerical effluent limitations. It is anticipated that the discharge will not cause or contribute to the impairment.

This facility was included in the EPA approved (8/30/2004) Appomattox River Watershed Bacteria TMDL and received an *E. coli* WLA of 4.01E+13 CFU/year based on an effluent concentration of 126 CFU/100 mL and a design flow of 23 MGD. The 2012 permit includes a monthly average (geometric mean) limitation of 126 CFU/100 mL for *E. coli* that ensures compliance with the total maximum daily load WLA.

This facility (formerly Petersburg Sewage Treatment Plant) was also included in the RCWQMP (and subsequently 9VAC25-720-60, Table B-7) and received a 2010 $cBOD_5$ WLA of 2,802 lb/d (year round) based on an effluent concentration of 22.4 mg/L and a design flow of 15.00 MGD, a 2010 ammonia as nitrogen (June – October) WLA of 801 lb/d based on an effluent concentration of 6.4 mg/L and a design flow of 15.00 MGD, a 2010 ammonia as nitrogen (November – May) WLA of 2,028 lb/d based on an effluent concentration of 16.2 mg/L and a design flow of 15.00 MGD, and a 2010 daily average minimum DO WLA of 5.0 mg/L. However, this facility expanded its design flow to 23.00 MGD after the development of the RCWQMP. Therefore, a monthly average $cBOD_5$ limitation of 15 mg/L at a design flow of 23.00 MGD has been included in the 2012 permit, which ensures compliance with the RCWQMP WLA of 2,802 lb/d. Also, a monthly average ammonia as nitrogen (June – October) limitation of 4.17 mg/L at a design flow of 23.00 MGD has been included in the 2012 permit, which ensures compliance with the RCWQMP WLA of 801 lb/d. A monthly average ammonia as nitrogen (November – May) limitation of 7.52 mg/L) at a design flow of 23.00 has been included in the 2012 permit, which ensures compliance with the RCWQMP of 2,028 lb/d. Lastly, a daily minimum DO limitation of 5.0 mg/L has been included in the 2012 permit, which ensures compliance with the RCWQMP WLA of 5.0 mg/L.

During the 2010 Water Quality Assessment the stream segment receiving the effluent was considered fully supporting of the Recreation and Wildlife Use.

26. Additional Comments:

Previous Board Action:

- None

Staff Comments:

- The original application was received on 5/9/2011. Additional information was received on 5/26/2011, 5/27/2011, and 6/6/2011. A complete application was received 180 days prior to permit expiration; therefore, the 2010 modified permit is eligible for administrative continuance.

- The permittee has completed the e-DMR registration process, has been accepted into the e-DMR program, and is a current participant.

- The permittee is not currently a Virginia Environmental Excellence Program (VEEP) participant.

- The annual permit maintenance fee was deposited on 9/6/2011.

- This permit reissuance is considered to be non-controversial. The staff believes that the proposed effluent limitations will maintain the Water Quality Standards adopted by the State Water Control Board (SWCB).

- The permittee was issued a Warning Letter on 3/30/2009 for not maintaining the appropriate pH on a batch of sewage sludge tested on 3/9/2009.

- This facility is subject to the requirements of 9 VAC 25-151, General VPDES Permit for Discharges of Storm Water Associated with Industrial Activity, since the permitted design flow of the wastewater treatment plant is greater than 1.0 MGD. The permittee currently holds a "No Exposure Certification" for exclusion from VPDES storm water permitting which is effective through 1/24/2016.

- Effluent sampling/compliance point language contained in Parts I.A.1.c and I.A.2.c was established during the 2006 permit reissuance process (owner comment period). Since the facility has not altered its outfall configuration, this language has not been revised in the 2012 permit.

EPA Comments:

- To be determined

VDH-ODW Comments:

- The Virginia Department of Health – Office of Drinking Water reviewed the permit application and had no objections. They indicated that the raw water intake for the Virginia American Water Company is located approximately 10 miles downstream of the discharge and that this distance should be efficient enough to minimize the impacts of the discharge.

DCR Comments:

- The Virginia Department of Conservation and Recreation (DCR) was solicited for permit reissuance comments. DCR recommended "the implementation and strict adherence to storm water management law/regulations and utilization of new technologies as they become available to improve water quality." See **Attachment K**. The permittee currently holds a "No Exposure Certification" for exclusion from VPDES storm water permitting (effective through 1/24/2016). Therefore, it is anticipated that storm water runoff from this facility will not have an impact on in-stream water quality.

DGIF-ESS Comments:

- The Virginia Department of Game and Inland Fisheries' (DGIF) Environmental Services Section was solicited for permit reissuance comments. At the time of inquiry, DGIF was unable to provide comments.

Owner Comments:

- Changes to the draft permit in response to owner comments have been documented in Item 21 of this fact sheet. Owner comments and DEQ staff responses are included in **Attachment M**.

Planning Conformance Statement:

- On 11/22/2011 the Water Resources Development Staff indicated that the discharge is in conformance with the existing planning documents for the area.

27. Summary of Attachments:

Attachment A	Flow Frequency Analysis Memo
Attachment B	Facility Flow Diagram
Attachment C	Topographic Map
Attachment D	Site Inspection Report
Attachment E	Effluent DMR Data
Attachment F	Water Quality Criteria Monitoring Summary
Attachment G	Stream Sanitation Analysis Memo
Attachment H	MSTRANTI & STATS Analyses
Attachment I	Excerpt from Richmond-Crater Water Quality Management Plan
Attachment J	Whole Effluent Toxicity Memo
Attachment K	Threatened & Endangered Species Coordination Comments
Attachment L	Reduced Monitoring Evaluation
Attachment M	Owner Comments & DEQ Staff Responses

Attachment A

Flow Frequency Analysis Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
South Central Wastewater Authority WWTF – VA0025437

TO: Andrew Hammond, P.E.

FROM: Jennifer Palmore, P.G.

DATE: May 16, 2011

COPIES: Modeling File

The South Central Wastewater Authority's wastewater treatment facility (SCWWTF) discharges to the Appomattox River in Petersburg, VA. The outfall is located at rivermile 2-APP010.91. Flow frequencies have been requested at this site for use in developing effluent limitations for the VPDES permit.

The Appomattox River is tidally influenced at the discharge point. Flow frequencies cannot be determined for tidal streams. However, the discharge is located near the tidal limit; therefore the freshwater inflow to the tidal Appomattox River can be used for use in determining permit limits. The flow frequencies at the Appomattox River at Matoaca, VA gage (#02041650) are presented below and can be used as an approximation of freshwater inflow.

Appomattox River at Matoaca, VA (#02041650):
Drainage area = 1,344 mi^2
Statistical period = 1970-2003

1Q30 = 26 cfs (17 MGD)	High Flow 1Q10 = 166 cfs (107 MGD)
1Q10 = 41 cfs (26 MGD)	High Flow 7Q10 = 200 cfs (129 MGD)
7Q10 = 48 cfs (31 MGD)	High Flow 30Q10 = 373 cfs (241 MGD)
30Q10 = 60 cfs (39 MGD)	HM = 338 cfs (218 MGD)
30Q5 = 84 cfs (54 MGD)	

This analysis does not address any withdrawals, discharges, or springs influencing the flow between the gauge and the fall line. Please note that the flow in the Appomattox is regulated by the dam at Lake Chesdin. The high flow months are December through April.

The discharge is located in the tidal freshwater zone of the James River Basin, therefore the aquatic life freshwater criteria should be used when calculating permit limits.

During the 2010 305(b)/303(d) Water Quality Assessment, the Appomattox River was considered a Category 5F water ("The WQ Standard is attained for a pollutant(s) with a TMDL and 303(d) delisting approved but the water remains impaired for additional pollutant(s) requiring TMDL development.") The applicable fact sheets are attached. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV) in the Appomattox River tidal freshwater estuary (APPTF); in addition, benthic alteration is considered a non-impairing observed effect based on probabilistic monitoring. The Fish Consumption Use is impaired due to a VDH advisory for PCBs. The Recreation- and Wildlife Uses are considered fully supporting.

The South Central Wastewater Authority discharge was addressed in the Appomattox River Watershed Bacterial TMDL, which was approved by the EPA on 8/30/2004 and by the SWCB on 12/20/2005. The facility received an annual E. coli wasteload allocation of 4.01E+13 cfu/year based on a design flow of 23 MGD.

SCWWTF was also addressed in the Chesapeake Bay TMDL which was approved by the EPA on 12/29/2010. The discharge is included in the aggregated total nitrogen-, total phosphorus-, and total suspended solids wasteload allocations for significant wastewater dischargers in segment APPTF.

Water quality data from monitoring station 2-APP012.79 is attached. The station is located on the Appomattox River at the Route 36 bridge, approximately 1.9 miles upstream of the discharge. The station is located on the nontidal portion of the Appomattox and represents freshwater inflow.

The Richmond-Crater Water Quality Management Plan allocates BOD, ammonia, and dissolved oxygen in order to maintain a minimum dissolved oxygen of 5.0 mg/L in the tidal Appomattox and upper tidal James River. As this equates to the Water Quality Standard at the time that the plan was developed, the tidal Appomattox River has been considered a Tier 1 water.

If you have any questions concerning this analysis, please let me know.

Hammond, Andrew (DEQ)

From: Palmore, Jennifer (DEQ)
Sent: Friday, May 20, 2011 3:38 PM
To: Hammond, Andrew (DEQ)
Subject: RE: VA0025437 - South Central Wastewater Authority - Flow Frequency Request

Use the CORMIX values. Thanks.

Jennifer

From: Hammond, Andrew (DEQ)
Sent: Friday, May 20, 2011 11:37 AM
To: Palmore, Jennifer (DEQ)
Subject: RE: VA0025437 - South Central Wastewater Authority - Flow Frequency Request

Hi Jennifer,

During the previous permit reissuance, DEQ utilized the tidal dilution ratios established in the attached memo to derive wasteload allocations for limitation evaluation. Should I utilize these dilution ratios for this permit reissuance or freshwater inflow values (flow frequency memo) and mixing information (established with mix.exe) ?

Thanks,
Drew

Andrew J. Hammond II, P.E.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph: 804.527.5048
Fx: 804.527.5106
Andrew.Hammond@deq.virginia.gov

From: Palmore, Jennifer (DEQ)
Sent: Monday, May 16, 2011 11:28 AM
To: Hammond, Andrew (DEQ)
Subject: RE: VA0025437 - South Central Wastewater Authority - Flow Frequency Request

Attached is the flow frequency that you requested. Please let me know if you have any questions. Thanks.

Jennifer

From: Hammond, Andrew (DEQ)
Sent: Thursday, May 12, 2011 4:47 PM
To: Palmore, Jennifer (DEQ)
Subject: VA0025437 - South Central Wastewater Authority - Flow Frequency Request

Jennifer,

See the attached flow frequency request for South Central Wastewater Authority WWTF (VA0025437).

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080207

STREAM NAME: **Appomattox River**

TMDL ID: **APPTF-SAV-BAY** **2010 IMPAIRED AREA ID:** CB-APPTF

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: - Sq. Mi. **Watershed:** VAP-J15E

INITIAL LISTING: 2006

UPSTREAM LIMIT: Tidal limits

DOWNSTREAM LIMIT: Mouth at James River

Tidal Appomattox River Estuary

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Shallow Water Sub Use - Not Supporting

IMPAIRMENT: Submerged Aquatic Vegetation

The Chesapeake Bay Water Quality Standards were adopted during the 2006 cycle. During the 2008 cycle, the Appomattox River Tidal Fresh segment (APPTF) failed the Submerged Aquatic Vegetation acreage requirements, and the water clarity Acreage criteria.

IMPAIRMENT SOURCE: NPS - Unknown

The Tributary Strategies Have Been Developed

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River and Various Tributaries**

TMDL ID: **G01E-03-PCB** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2014

IMPAIRED SIZE: ~325 - Stream mile **Watershed:** VAP-G01E

INITIAL LISTING: 2002

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Hampton Roads Bridge Tunnel

Estuarine James River from the fall line to the Hampton Roads Bridge Tunnel, including several tributaries listed below.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

IMPAIRMENT: Fish Tissue - PCBs, VDH Fish Consumption Restriction

During the 2002 cycle, the James River from the Fall line to Queens Creek was considered not supporting of the Fish Consumption Use due to PCBs in multiple fish species at multiple DEQ monitoring locations.

During the 2004 cycle, a VDH Fish Consumption Restriction was issued from the fall line to Flowerdew Hundred and the segment was adjusted slightly to match the Restriction. In addition, in the 2004 cycle, the Chickahominy River from Walkers Dam to Diascund Creek was assessed as not supporting the Fish Consumption Use because the DEQ screening value for PCBs was exceeded in 3 species during sampling in 2001.

During the 2006 cycle, the VDH restriction was extended on 12/13/2004 to extend from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and include the tidal portions of the following tributaries:

Appomattox River up to Lake Chesdin Dam
Bailey Creek up to Route 630
Bailey Bay
Chickahominy River up to Walkers Dam
Skiffes Creek up to Skiffes Creek Dam
Pagan River and its tributary Jones Creek
Chuckatuck Creek
Nansemond River and its tributaries Bennett Creek and Star Creek
Hampton River
Willoughby Bay and the Elizabeth R. system (Western, Eastern, and Southern Branches and Lafayette R.) and tributaries St. Julian Creek, Deep Creek, and Broad Creek

The advisory was modified again on 10/10/2006 to add Poythress Run.

The impairments were combined. The TMDL for the lower extended portion is due in 2018.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and is not included in the VDH Fish Consumption Advisory.

IMPAIRMENT SOURCE: Unknown

The source of the PCBs is considered unknown.

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080207

STREAM NAME: **Appomattox River**

TMDL ID: **J15E-01-BAC** **2010 IMPAIRED AREA ID:** CB-APPTF

ASSESSMENT CATEGORY: 4A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 2.06 - Sq. Mi. **Watershed:** VAP-J15E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Fall line at Rout 1/301 bridge

DOWNSTREAM LIMIT: Mouth

Tidal Appomattox River

CLEAN WATER ACT GOAL AND USE SUPPORT:

Recreation Use - Not Supporting

IMPAIRMENT: E. coli

The segment was assessed not supporting of the Recreation use support goal based on fecal coliform violations at 2-APP001.53 near the Route 10 bridge. The segment was initially listed in 1998, therefore the TMDL is due in 2010.

The bacteria TMDL for the Appomattox River was completed and approved by EPA on 8/30/2004. The segment should be assessed as Cat. 4A.

In 2006, the bacteria impairment switched from fecal coliform to E. coli.

For the 2008 cycle the lower portion of the Appomattox segment fails for the recreation use with a violation rate of 5/40 at station 2-APP001.53. The Appomattox upstream of mile 5 is fully supporting for E.coli with a violation rate of 1/10 at station 2-APP009.52 and should be assessed as category 2C.

During the 2010 cycle the segment failed for E.coli at station 2-APP001.53 with a violation rate of 8/59.

IMPAIRMENT SOURCE: NPS - Agriculture, PS -Municipal

Sources were addressed in the report in which allocations were calculated for PS-municipal, agriculture and NPS.

RECOMMENDATION: TMDL Completed

Sta Id	Watershed Code	Collection Date Time	Depth Desc	Depth	Container Id Desc	HARDNESS, TOTAL (MG/L AS CACO3)	
						Value	Com Code
2-APP012.79	VAP-J15R	02/27/1989 13:00	S	0.3	R	22	
2-APP012.79	VAP-J15R	03/20/1989 14:00	S	0.3	R	24	
2-APP012.79	VAP-J15R	04/18/1989 13:15	S	0.3	R	22	
2-APP012.79	VAP-J15R	05/23/1989 17:15	S	0.3	R	22	
2-APP012.79	VAP-J15R	06/22/1989 15:00	S	0.3	R	24	
2-APP012.79	VAP-J15R	07/24/1989 14:10	S	0.3	R	24	
2-APP012.79	VAP-J15R	09/19/1989 13:15	S	0.3	R	30	
2-APP012.79	VAP-J15R	10/19/1989 12:35	S	0.3	R	30	
2-APP012.79	VAP-J15R	11/16/1989 13:20	S	0.3	R	28	
2-APP012.79	VAP-J15R	12/28/1989 13:40	S	0.3	R	28	
2-APP012.79	VAP-J15R	01/31/1990 17:00	S	0.3	R	25	
2-APP012.79	VAP-J15R	03/20/1990 14:00	S	0.3	R	30	
2-APP012.79	VAP-J15R	04/18/1990 15:30	S	0.3	R	26	
2-APP012.79	VAP-J15R	05/17/1990 13:20	S	0.3	R	32	
2-APP012.79	VAP-J15R	06/19/1990 13:55	S	0.3	R	22	
2-APP012.79	VAP-J15R	07/19/1990 15:30	S	0.3	R	26	
2-APP012.79	VAP-J15R	08/16/1990 15:00	B	1	R	42	
2-APP012.79	VAP-J15R	09/26/1990 14:38	S	0.3	R	40	
2-APP012.79	VAP-J15R	10/18/1990 13:50	S	0.3	R	38	
2-APP012.79	VAP-J15R	11/20/1990 14:09	S	0.3	R	42	
2-APP012.79	VAP-J15R	12/27/1990 14:45	S	0.09	R	38	
2-APP012.79	VAP-J15R	01/17/1991 15:30	S	0.3	R	28	
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2-APP012.79	VAP-J15R	03/26/1991 14:50	S	0.09	R	24	
2-APP012.79	VAP-J15R	04/24/1991 15:00	S	0.09	R	32	
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2-APP012.79	VAP-J15R	06/17/1991 17:10	S	0.3	R	46	
2-APP012.79	VAP-J15R	07/17/1991 16:04	S	0.3	R	32	
2-APP012.79	VAP-J15R	08/15/1991 13:38	S	0.3	R	25	
2-APP012.79	VAP-J15R	09/17/1991 16:00	S	0.3	R	0	O
2-APP012.79	VAP-J15R	12/05/1991 13:28	S	0.3	R	28	
2-APP012.79	VAP-J15R	01/02/1992 15:16	S	0.3	R	30	
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2-APP012.79	VAP-J15R	03/03/1992 13:45	S	0.3	R	30	
2-APP012.79	VAP-J15R	04/02/1992 13:40	S	0.3	R	32	
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2-APP012.79	VAP-J15R	08/25/1992 12:42	S	0.3	R	50	
2-APP012.79	VAP-J15R	09/23/1992 15:07	S	0.3	R	42	
2-APP012.79	VAP-J15R	10/26/1992 13:55	S	0.3	R	48	
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2-APP012.79	VAP-J15R	08/16/1993 15:00	S	0.3	R	30	
2-APP012.79	VAP-J15R	09/14/1993 14:11	S	0.3	R	50	
2-APP012.79	VAP-J15R	10/12/1993 14:00	S	0.3	R	44	

Sta Id	Watershed Code	Collection Date Time	Depth Desc	Depth	Container Id Desc	HARDNESS, TOTAL (MG/L AS CACO3)	
						Value	Com Code
2-APP012.79	VAP-J15R	11/03/1993 10:22	S	0.3	R	38	
2-APP012.79	VAP-J15R	12/08/1993 11:11	S	0.3	R	22	
2-APP012.79	VAP-J15R	02/03/1994 13:00	S	0.3	R	23	
2-APP012.79	VAP-J15R	03/01/1994 14:00	S	0.3	R	17	
2-APP012.79	VAP-J15R	04/05/1994 15:11	S	0.3	R	17	
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2-APP012.79	VAP-J15R	06/01/1994 10:00	S	0.3	R	26	
2-APP012.79	VAP-J15R	07/06/1994 11:44	S	0.3	R	26	
2-APP012.79	VAP-J15R	08/02/1994 10:00	S	0.3	R	32	
2-APP012.79	VAP-J15R	09/07/1994 11:00	S	0.3	R	31	
2-APP012.79	VAP-J15R	10/04/1994 11:24	S	0.3	R	28	
2-APP012.79	VAP-J15R	11/08/1994 10:30	S	0.3	R	24	
2-APP012.79	VAP-J15R	12/12/1994 10:30	S	0.3	R	24	
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2-APP012.79	VAP-J15R	03/02/1995 09:31	S	0.3	R	24	
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2-APP012.79	VAP-J15R	06/07/1995 09:35	S	0.3	R	28	
2-APP012.79	VAP-J15R	07/12/1995 11:13	S	0.3	R	29	
2-APP012.79	VAP-J15R	08/07/1995 11:00	S	0.3	R	29	
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2-APP012.79	VAP-J15R	05/19/1997 09:11	S	0.3	R	25.2	
2-APP012.79	VAP-J15R	06/11/1997 06:15	S	0.3	R	31.9	
2-APP012.79	VAP-J15R	07/29/1997 09:15	S	0.3	R	31.5	
2-APP012.79	VAP-J15R	08/25/1997 15:00	S	0.3	R	41.4	
2-APP012.79	VAP-J15R	09/30/1997 15:20	S	0.3	R	34.4	
2-APP012.79	VAP-J15R	10/23/1997 11:30	S	0.3	R	33.1	
2-APP012.79	VAP-J15R	11/25/1997 10:00	S	0.3	R	27.2	
2-APP012.79	VAP-J15R	12/16/1997 13:33	S	0.3	R	21.9	
2-APP012.79	VAP-J15R	01/21/1998 13:55	S	0.3	R	25.2	
2-APP012.79	VAP-J15R	02/18/1998 13:44	S	0.3	R	27.6	
2-APP012.79	VAP-J15R	03/23/1998 08:10	S	0.3	R	10.9	
2-APP012.79	VAP-J15R	04/28/1998 13:15	S	0.3	R	17.5	
2-APP012.79	VAP-J15R	05/12/1998 16:35	S	0.3	R	15.8	

Sta Id	Watershed Code	Collection Date Time	Depth Desc	Depth	Container Id Desc	HARDNESS, TOTAL (MG/L AS CACO3)	
						Value	Com Code
2-APP012.79	VAP-J15R	06/17/1998 11:10	S	0.3	R	24.5	
2-APP012.79	VAP-J15R	07/23/1998 10:55	S	0.3	R	34.3	
2-APP012.79	VAP-J15R	08/20/1998 07:00	S	0.3	R	32.6	
2-APP012.79	VAP-J15R	09/17/1998 13:30	S	0.3	R	28.7	
2-APP012.79	VAP-J15R	10/19/1998 10:30	S	0.3	R	44	
2-APP012.79	VAP-J15R	11/30/1998 07:30	S	0.3	R	31	
2-APP012.79	VAP-J15R	12/21/1998 14:35	S	0.3	R	34.1	
2-APP012.79	VAP-J15R	01/20/1999 08:00	S	0.3	R	28	
2-APP012.79	VAP-J15R	02/17/1999 07:45	S	0.3	R	48	
2-APP012.79	VAP-J15R	03/10/1999 14:15	S	0.3	R	64	
2-APP012.79	VAP-J15R	04/14/1999 11:00	S	0.3	R	28	
2-APP012.79	VAP-J15R	05/27/1999 10:20	S	0.3	R	30	
2-APP012.79	VAP-J15R	06/30/1999 10:00	S	0.3	R	28.5	
2-APP012.79	VAP-J15R	07/15/1999 14:20	S	0.3	R	27.2	
2-APP012.79	VAP-J15R	08/30/1999 15:30	S	0.3	R	35.5	
2-APP012.79	VAP-J15R	09/23/1999 14:00	S	0.3	R	13.2	
2-APP012.79	VAP-J15R	10/19/1999 15:56	S	0.3	R	25.8	
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2-APP012.79	VAP-J15R	01/06/2000 11:00	S	0.3	R	29.5	
2-APP012.79	VAP-J15R	02/08/2000 15:30	S	0.3	R	28.8	
2-APP012.79	VAP-J15R	03/09/2000 16:25	S	0.3	R	21	
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2-APP012.79	VAP-J15R	06/21/2000 11:16	S	0.3	R	27.8	
2-APP012.79	VAP-J15R	07/11/2000 11:51	S	0.3	R	32	
2-APP012.79	VAP-J15R	08/15/2000 12:10	S	0.3	R	22.7	
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2-APP012.79	VAP-J15R	12/19/2000 10:40	S	0.3	R	33.5	
2-APP012.79	VAP-J15R	01/25/2001 13:25	S	0.3	R	23.2	
2-APP012.79	VAP-J15R	02/12/2001 13:30	S	0.3	R	19.5	
2-APP012.79	VAP-J15R	03/12/2001 13:50	S	0.3	R	14.2	
2-APP012.79	VAP-J15R	04/26/2001 15:20	S	0.3	R	11.1	
2-APP012.79	VAP-J15R	05/09/2001 13:00	S	0.3	R	23.3	
2-APP012.79	VAP-J15R	07/11/2001 14:20	S	0.3	R	26.8	
2-APP012.79	VAP-J15R	09/11/2001 14:00	S	0.3	R	53.1	
2-APP012.79	VAP-J15R	11/26/2001 14:25	S	0.3	R	16.1	
2-APP012.79	VAP-J15R	01/10/2002 12:35	S	0.3	R	19.9	
2-APP012.79	VAP-J15R	03/11/2002 14:30	S	0.3	R	28	
2-APP012.79	VAP-J15R	05/08/2002 12:30	S	0.3	R	17.6	
2-APP012.79	VAP-J15R	08/14/2002 13:00	S	0.3	R	36.8	
2-APP012.79	VAP-J15R	10/15/2002 13:55	S	0.3	R	29.5	
2-APP012.79	VAP-J15R	12/04/2002 13:00	S	0.3	R	10.6	
2-APP012.79	VAP-J15R	02/03/2003 13:10	S	0.3	R	27.5	
2-APP012.79	VAP-J15R	04/17/2003 14:05	S	0.3	R	17.6	
2-APP012.79	VAP-J15R	06/05/2003 13:15	S	0.3	R	24.5	
2-APP012.79	VAP-J15R	08/20/2003 12:00	S	0.3	R	18.5	
2-APP012.79	VAP-J15R	10/29/2003 14:50	S	0.3	R	21.8	
2-APP012.79	VAP-J15R	12/17/2003 15:20	S	0.3	R	24	
2-APP012.79	VAP-J15R	02/19/2004 12:55	S	0.3	R	19	
2-APP012.79	VAP-J15R	04/28/2004 14:30	S	0.3	R	20	
2-APP012.79	VAP-J15R	06/08/2004 12:40	S	0.3	S1	28	

Sta Id	Watershed Code	Collection Date Time	Depth Desc	Depth	Container Id Desc	HARDNESS, TOTAL (MG/L AS CACO3)	
						Value	Com Code
2-APP012.79	VAP-J15R	06/28/2004 14:10	S	0.3	R	28	
2-APP012.79	VAP-J15R	09/22/2004 13:50	S	0.3	R	19.6	
2-APP012.79	VAP-J15R	11/22/2004 13:35	S	0.3	R	26	
2-APP012.79	VAP-J15R	01/31/2005 12:35	S	0.3	R	24	
2-APP012.79	VAP-J15R	03/09/2005 12:30	S	0.3	R	26	
2-APP012.79	VAP-J15R	05/31/2005 13:00	S	0.3	R	30	
2-APP012.79	VAP-J15R	07/12/2005 13:05	S	0.3	R	32	
2-APP012.79	VAP-J15R	09/19/2005 12:15	S	0.3	R	36	
2-APP012.79	VAP-J15R	11/14/2005 12:25	S	0.3	R	34	
2-APP012.79	VAP-J15R	01/25/2006 12:55	S	0.3	R	28	
2-APP012.79	VAP-J15R	03/23/2006 12:05	S	0.3	R	27	
2-APP012.79	VAP-J15R	05/09/2006 12:40	S	0.3	R	35	
2-APP012.79	VAP-J15R	07/12/2006 11:50	S	0.3	R	30	
2-APP012.79	VAP-J15R	09/19/2006 11:35	S	0.3	R	20	
2-APP012.79	VAP-J15R	11/15/2006 11:40	S	0.3	R	18	
2-APP012.79	VAP-J15R	01/18/2007 11:15	S	0.3	R	18	
					Average	**28.7**	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	6/28/1968	S	0.3	23.33	8		8		
2-APP012.79	7/24/1968	S	0.3	28.89	8		7.5		
2-APP012.79	8/22/1968	S	0.3	29.44	8		8		
2-APP012.79	9/9/1968	S	0.3	23.89	7		8.5		
2-APP012.79	10/24/1968	S	0.3	21.11	7		6.2		
2-APP012.79	2/3/1969	S	0.3	5	7		12.39		
2-APP012.79	4/28/1969	S	0.3	18.33	7		8.5		
2-APP012.79	7/24/1969	S	0.3	27.22	7		7.5		
2-APP012.79	3/24/1970	S	0.3	7.78	6.9		11.79		
2-APP012.79	4/22/1970	S	0.3	16.67	7.7		10		
2-APP012.79	5/6/1970	S	0.3	18.33	7.8		10		
2-APP012.79	6/29/1970	S	0.3	20.56	7.5		8.6		
2-APP012.79	12/15/1970	S	0.3	5.56	6.8		12.19		
2-APP012.79	1/18/1971	S	0.3	4.44	6.7		9.4		
2-APP012.79	2/14/1971	S	0.3	3.89	6.7		10		
2-APP012.79	3/15/1971	S	0.3	8.89	7.4		12		
2-APP012.79	4/28/1971	S	0.3	15	7.3		10		
2-APP012.79	5/13/1971	S	0.3	20	6.8		9.8		
2-APP012.79	6/27/1971	S	0.3	27.78	7.7		7.6		
2-APP012.79	7/8/1971	S	0.3	26.67	8.5		8		
2-APP012.79	8/2/1971	S	0.3	25.56	7.3		8.2		
2-APP012.79	9/23/1971	S	0.3	20.56	7		8.4		
2-APP012.79	10/5/1971	S	0.3	22.78	7.4		9.2		
2-APP012.79	11/29/1971	S	0.3	6.67	7		11.5		
2-APP012.79	12/20/1971	S	0.3	6.11	7		10.39		
2-APP012.79	1/20/1972	S	0.3	3.33	6.7		9.8		
2-APP012.79	2/10/1972	S	0.3	1.67	6.7		10.79		
2-APP012.79	3/20/1972	S	0.3	11.11	7				
2-APP012.79	4/4/1972	S	0.3	12.78	7.5		10		
2-APP012.79	5/5/1972	S	0.3	20	6.7		7.4		
2-APP012.79	7/14/1972	S	0.3	26.11	6.8		7.9		
2-APP012.79	8/17/1972	S	0.3	24.44	7.5		9		
2-APP012.79	9/26/1972	S	0.3	23.33	7.5		7.2		
2-APP012.79	10/26/1972	S	0.3	14.44	7.2		9.6		
2-APP012.79	11/27/1972	S	0.3	7.78	7.3		10.79		
2-APP012.79	12/12/1972	S	0.3	11.11	6.7		11.79		
2-APP012.79	1/29/1973	S	0.3	5.56	6.8		11.39		
2-APP012.79	2/20/1973	S	0.3	3.33	6.8		13.79		
2-APP012.79	3/30/1973	S	0.3	12.22	7		11.19		
2-APP012.79	4/18/1973	S	0.3	13.33	6.9		10.59		
2-APP012.79	5/3/1973	S	0.3	17.22	6.7		8.6		
2-APP012.79	6/9/1973	S	0.3	27.78	7.2		8		
2-APP012.79	7/15/1973	S	0.3	26.67	7.2		7.6		
2-APP012.79	8/29/1973	S	0.3	27.78	8.5		9.5		
2-APP012.79	9/17/1973	S	0.3	24.44	7.2		8		
2-APP012.79	10/12/1973	S	0.3	21.11			8.4		
2-APP012.79	11/15/1973	S	0.3	13.89	7.5		10.79		
2-APP012.79	12/14/1973	S	0.3	8.89	7.5		12.59		
2-APP012.79	1/24/1974	S	0.3	8.89	6.8		10.19		
2-APP012.79	2/5/1974	S	0.3	9.44	7.3		11.39		
2-APP012.79	3/22/1974	S	0.3	11.11	7.5		11.59		
2-APP012.79	4/8/1974	S	0.3	13.33	7		10		
2-APP012.79	5/15/1974	S	0.3	21.11	7.5		8		
2-APP012.79	5/31/1974	S	0.3	21.67	7.5		8.2		
2-APP012.79	7/16/1974	S	0.3	25	7.5		6.8		
2-APP012.79	8/11/1974	S	0.3	26.67	7.5		8.2		
2-APP012.79	9/10/1974	S	0.3	22.22	7.3		8.8		
2-APP012.79	10/16/1974	S	0.3	20	7		10.59		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	11/17/1974	S	0.3	11.11	7.5		12		
2-APP012.79	12/18/1974	S	0.3	5.56	7		12.19		
2-APP012.79	1/29/1975	S	0.3	6.67	7		12.39		
2-APP012.79	2/26/1975	S	0.3	9	7		10.59		
2-APP012.79	3/17/1975	S	0.3	5	6.8		12.19		
2-APP012.79	4/11/1975	S	0.3	11.11	7		10.59		
2-APP012.79	5/13/1975	S	0.3	20	7.5		9		
2-APP012.79	6/2/1975	S	0.3	25	7.5		8.2		
2-APP012.79	7/10/1975	S	0.3	26.67	7.8		7.8		
2-APP012.79	9/11/1975	S	0.3						
2-APP012.79	10/13/1975	S	0.3	18.89	7		9.4		
2-APP012.79	11/25/1975	S	0.3	12.22	7.5		11.19		
2-APP012.79	12/11/1975	S	0.3	8.89	7.5				
2-APP012.79	1/28/1976	S	0.3	3.89	7.5		12		
2-APP012.79	3/15/1976	S	0.3	12.22	8.6		10.79		
2-APP012.79	4/21/1976	S	0.3	16.11	8.7		9		
2-APP012.79	5/17/1976	S	0.3	22.22			8.4		
2-APP012.79	7/26/1976	S	0.3	27.78	8		8.3		
2-APP012.79	10/18/1976	S	0.3	15	7.5		9.6		
2-APP012.79	12/15/1976	S	0.3	5	7.5		13.39		
2-APP012.79	2/7/1977	S	0.3	3	7.5		13		
2-APP012.79	4/13/1977	S	0.3	19	7.5		7.9		
2-APP012.79	5/13/1977	S	0.3	19	7.5		7.9		
2-APP012.79	5/19/1977	S	0.3	23	7.5		8.4		
2-APP012.79	6/9/1977	S	0.3	2.1	8.5		8.4		
2-APP012.79	6/10/1977	S	0.3	21	8.5		8.4		
2-APP012.79	7/1/1977	S	0.3	27	8		7.8		
2-APP012.79	10/17/1977	S	0.3	1.5	7.7		1.1		
2-APP012.79	11/16/1977	S	0.3	16	7.5		9.5		
2-APP012.79	12/19/1977	S	0.3	1	7		13.5		
2-APP012.79	1/17/1978	S	0.3	0.2	7		16.39		
2-APP012.79	4/17/1978	S	0.3	15	7.8		10.79		
2-APP012.79	5/25/1978	S	0.3	22	7.5		7.8		
2-APP012.79	6/9/1978	S	0.3	6	8		8.6		
2-APP012.79	7/24/1978	S	0.3	31	7.5		7.2		
2-APP012.79	8/21/1978	S	0.3	25.5	7		9		
2-APP012.79	9/11/1978	S	0.3	29	7		7.5		
2-APP012.79	10/17/1978	S	0.3	16.5			9.1		
2-APP012.79	1/18/1979	S	0.3	3	7		12.4		
2-APP012.79	1/31/1979	S	0.3	4	6.5		10.8		
2-APP012.79	4/10/1979	S	0.3	16	7		7		
2-APP012.79	6/12/1979	S	0.3	21	7.5		7.8		
2-APP012.79	8/14/1979	S	0.3	24.5	7.5		8		
2-APP012.79	10/17/1979	S	0.3	16	7.3		10		
2-APP012.79	11/20/1979	S	0.3	11.5	6.5		10.5		
2-APP012.79	12/18/1979	S	0.3	6	7		12.6		
2-APP012.79	1/14/1980	S	0.3	3.5	6.5		13.9		
2-APP012.79	2/20/1980	S	0.3	5.5	7.5		9.8		
2-APP012.79	3/26/1980	S	0.3	11			11		
2-APP012.79	4/23/1980	S	0.3	20	7.5		8.8		
2-APP012.79	5/21/1980	S	0.3	20	7.7		9.1		
2-APP012.79	6/25/1980	S	0.3	26	7.7		7.6		
2-APP012.79	7/9/1980	S	0.3	28.5	7.6		8.2		
2-APP012.79	7/13/1980	S	0.3	29.5	8		7.3		
2-APP012.79	7/15/1980	S	0.3	29.2	7.9		6.8		
2-APP012.79	8/5/1980	S	0.3	28.5	7.4		7.6		
2-APP012.79	10/28/1980	S	0.3	13.5	7.5		8.2		
2-APP012.79	11/18/1980	S	0.3	8.5	7.5		11.1		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	1/27/1981	S	0.3	7	7.4		9.3		
2-APP012.79	2/24/1981	S	0.3	7.5	7		12.6		
2-APP012.79	3/24/1981	S	0.3	10	7.5		11		
2-APP012.79	4/21/1981	S	0.3	15.5	8.4		10.2		
2-APP012.79	5/19/1981	S	0.3	18	7.6		9.3		
2-APP012.79	6/2/1981	S	0.3	20.5			9		
2-APP012.79	7/1/1981	S	0.3	27	7.7		7.4		
2-APP012.79	8/3/1981	S	0.3	27	7.8		7.1		
2-APP012.79	9/1/1981	S	0.3	27	8.2		7.9		
2-APP012.79	10/22/1981	S	0.3	15.5	7.8		8.2		
2-APP012.79	11/30/1981	S	0.3	7.5			10.2		
2-APP012.79	12/10/1981	S	0.3	4	7.4		10.6		
2-APP012.79	1/5/1982	S	0.3	4.5	6.9		10		
2-APP012.79	2/3/1982	S	0.3	3	6.2		10.4		
2-APP012.79	3/3/1982	S	0.3	6	6.7		9.5		
2-APP012.79	4/7/1982	S	0.3	12	7.5		8.8		
2-APP012.79	5/4/1982	S	0.3	20	9		8.8		
2-APP012.79	6/8/1982	S	0.3	20	7		7.5		
2-APP012.79	7/6/1982	S	0.3						
2-APP012.79	8/4/1982	S	0.3	28	6.5		7.5		
2-APP012.79	9/15/1982	S	0.3	22	7.3		8.6		
2-APP012.79	10/6/1982	S	0.3	23	7.2		8.7		
2-APP012.79	11/4/1982	S	0.3	17	7.5		10.2		
2-APP012.79	12/2/1982	S	0.3	12	6.8		11		
2-APP012.79	1/5/1983	S	0.3	6	6.6		11.7		
2-APP012.79	2/8/1983	S	0.3	6	6.7		12.6		
2-APP012.79	3/3/1983	S	0.3	9	6.7		12.4		
2-APP012.79	4/5/1983	S	0.3	11	6.8		11.2		
2-APP012.79	5/5/1983	S	0.3	21	7.5		9.8		
2-APP012.79	6/7/1983	S	0.3	24	7.5		8.7		
2-APP012.79	8/3/1983	S	0.3	27	7.3		7.7		
2-APP012.79	9/19/1983	S	0.3	23	7.5		14		
2-APP012.79	10/17/1983	S	0.3	19	7.3		9.4		
2-APP012.79	11/9/1983	S	0.3	14	7.7		10.5		
2-APP012.79	12/7/1983	S	0.3	8.5	6.8		11.5		
2-APP012.79	1/31/1984	S	0.3	2.5	6.7		14		
2-APP012.79	3/12/1984	S	0.3	8	6.4		11.9		
2-APP012.79	4/2/1984	S	0.3	11	6.6		11.4		
2-APP012.79	4/30/1984	S	0.3	10.3	6.3		7.3		
2-APP012.79	6/18/1984	S	0.3	25.5	6.1		7.4		
2-APP012.79	7/23/1984	S	0.3	26	7.07		7.2		
2-APP012.79	8/20/1984	S	0.3	26	6.61		7.8		
2-APP012.79	9/17/1984	S	0.3	20.5	7.6		10.2		
2-APP012.79	10/17/1984	S	0.3	18.6	7.3		9.3		
2-APP012.79	11/14/1984	S	0.3	10	6.6		14.2		
2-APP012.79	1/30/1985	S	0.3	2.6	6.7		15.2		
2-APP012.79	2/6/1985	S	0.3	2	5.8		13.6		
2-APP012.79	3/13/1985	S	0.3	9	6.1		13.1		
2-APP012.79	4/9/1985	S	0.3	13.5	9		11.6		
2-APP012.79	5/15/1985	S	0.3	20	7.5		9.2		
2-APP012.79	6/4/1985	S	0.3	25	7.5		8.4		
2-APP012.79	7/10/1985	S	0.3	26.6	7.2		6.4		
2-APP012.79	8/6/1985	S	0.3	25	7.5		8.9		
2-APP012.79	10/30/1985	S	0.3	12	7		11.1		
2-APP012.79	12/9/1985	S	0.3	9.6	6.8		12		
2-APP012.79	1/9/1986	S	0.3	2.5	6.7		13		
2-APP012.79	2/10/1986	S	0.3	5	7		14.8		
2-APP012.79	3/10/1986	S	0.3	10	7.2		13		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	4/7/1986	S	0.3	20	8.47		10.8		
2-APP012.79	5/14/1986	S	0.3	16.4	7.7		10.7		
2-APP012.79	6/17/1986	S	0.3	27.5	8.2		8.2		
2-APP012.79	7/17/1986	S	0.3	29.5	7.92		7.4		
2-APP012.79	8/14/1986	S	0.3	26.5	5.95		7.7		
2-APP012.79	9/17/1986	S	0.3	23	7.93		8.4		
2-APP012.79	10/22/1986	S	0.3	16	6		10.1		
2-APP012.79	11/24/1986	S	0.3	12	7.94		10		
2-APP012.79	12/15/1986	S	0.3	8	8.03		11.2		
2-APP012.79	1/20/1987	S	0.3	5	7.01		12.5		
2-APP012.79	2/12/1987	S	0.3	4	7.33		13.4		
2-APP012.79	3/23/1987	S	0.3	11	7.89		11.6		
2-APP012.79	4/21/1987	S	0.3	13.5	7.75		11		
2-APP012.79	5/11/1987	S	0.3	22	8.22		9		
2-APP012.79	6/8/1987	S	0.3	27.2	7.46		5.8		
2-APP012.79	7/6/1987	S	0.3	27	7.99		8.5		
2-APP012.79	8/11/1987	S	0.3	30	8.02		7.4		
2-APP012.79	9/16/1987	S	0.3	26.5	7.35		8.2		
2-APP012.79	10/15/1987	S	0.3	14.5	7.93		10.8		
2-APP012.79	11/23/1987	S	0.3	8	7.91		12.4		
2-APP012.79	12/8/1987	S	0.3	7.5	7.6		11.6		
2-APP012.79	1/19/1988	S	0.3	4	8.08		12.8		
2-APP012.79	2/16/1988	S	0.3	6.2	8		13.5		
2-APP012.79	3/15/1988	S	0.3	5.9	8.13		11.5		
2-APP012.79	4/12/1988	S	1	12.3	7.76		10.8		
2-APP012.79	5/11/1988	S	0.3	17	8.23		9.2		
2-APP012.79	6/8/1988	S	0.3	24.5	8.27		8.5		
2-APP012.79	7/12/1988	S	0.3	26	7.77		8.1		
2-APP012.79	8/25/1988	S	0.3	26.8	8.02		8		
2-APP012.79	9/20/1988	S	0.3	24.5	7.48		8.4		
2-APP012.79	10/18/1988	S	0.3	13.7	8.17		10		
2-APP012.79	11/9/1988	S	0.3	9	7		12		
2-APP012.79	1/31/1989	S	0.3	8.1	8.1		14.1		
2-APP012.79	2/27/1989	S	0.3						
2-APP012.79	3/20/1989	S	0.3	9.7	8.2		12.2		
2-APP012.79	4/18/1989	S	0.3	16.1	7.66		11.5		
2-APP012.79	5/23/1989	S	0.3	23	8		8.6		
2-APP012.79	6/22/1989	S	0.3	26.7	7.87		8		
2-APP012.79	7/24/1989	S	0.3	28.4	7.66		7.7		
2-APP012.79	8/15/1989	S	0.3	24.5	7.8		8.4		
2-APP012.79	9/19/1989	S	0.3	22.7	7.95		8.7		
2-APP012.79	10/19/1989	S	0.3	15.8	8.42		9.5		
2-APP012.79	11/16/1989	S	0.3	14.3	8.08		10		
2-APP012.79	12/28/1989	S	0.3	2.5	8.09		15.1		
2-APP012.79	1/17/1990	S	0.09			13.42			
2-APP012.79	1/17/1990	B	0.3	6.51	6.76	13.42			
2-APP012.79	1/31/1990	S	0.3	8.4	7.36		12.3		
2-APP012.79	2/19/1990	S	0.3						
2-APP012.79	2/20/1990	S	0.3						
2-APP012.79	3/20/1990	S	0.3	13.5	8.11		11.1		
2-APP012.79	4/18/1990	S	0.3	15	8.43		10.7		
2-APP012.79	5/17/1990	S	0.3	21.5	7.28		9.1		
2-APP012.79	6/19/1990	S	0.3	25.6	7.93		8.3		
2-APP012.79	7/19/1990	S	0.3	28.5	7.21		7.8		
2-APP012.79	8/16/1990	S	0.3	26.6	6.77		7.7		
2-APP012.79	8/16/1990	B	1						
2-APP012.79	9/26/1990	S	0.3	20.3	6.86		9.2		
2-APP012.79	9/26/1990	B	1						

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	10/18/1990	S	0.3	21.2	6.76		9.1		
2-APP012.79	11/20/1990	S	0.3	11.3	7.1	11.2	11.2		
2-APP012.79	11/20/1990	B	1	11.31	7.1				
2-APP012.79	12/27/1990	S	0.09	7.75	7.44	12.85			
2-APP012.79	1/17/1991	S	0.3	6.5	6.76		13.2		
2-APP012.79	2/7/1991	S	0.09	8.08	7.15	12.05	12.1		
2-APP012.79	3/26/1991	S	0.09	13.96	6.99	10.94	10.9		
2-APP012.79	3/26/1991	B	0.3						
2-APP012.79	4/24/1991	S	0.09	18.1	7.13	9.85			
2-APP012.79	5/22/1991	S	0.3	23.75	7.27		8.36		
2-APP012.79	6/17/1991	S	0.3	27.78	7.11		7.32		
2-APP012.79	7/17/1991	S	0.3	28.24	7.14	7.9			
2-APP012.79	8/15/1991	S	0.3	25.67	6.8	7.57			
2-APP012.79	9/17/1991	S	0.3	27.58	7.59	8.44			
2-APP012.79	9/17/1991	S	0.3						
2-APP012.79	10/16/1991	S	0.3	17.62	7.12	8.94			
2-APP012.79	11/6/1991	S	0.3	10.12	7.47	11.27			
2-APP012.79	12/5/1991	S	0.3	9.93	7.21	11.16			
2-APP012.79	1/2/1992	S	0.3	6.81	7.14	12.63			
2-APP012.79	2/3/1992	S	0.3	4.48	7.05	13.17			
2-APP012.79	3/3/1992	S	0.3	11.6	6.77	11.2			
2-APP012.79	4/2/1992	S	0.3	11.71	6.92	11.45			
2-APP012.79	5/4/1992	S	0.3	19.55	6.78	9.2			
2-APP012.79	6/1/1992	S	0.3	20.52	6.6	9.19			
2-APP012.79	7/15/1992	S	0.3	29.78	7.07	6.73			
2-APP012.79	8/25/1992	S	0.3	25.49	6.9	7.68			
2-APP012.79	9/23/1992	S	0.3	24.72	7.55	8.34			
2-APP012.79	10/26/1992	S	0.3	14.17	7.51	10.62			
2-APP012.79	11/23/1992	S	0.3	14.83	7.77	10.8			
2-APP012.79	12/10/1992	S	0.3	7.63	7.06	12.34			
2-APP012.79	1/21/1993	S	0.3	5.74	6.91	13.1			
2-APP012.79	2/25/1993	S	0.3	5.28	7.03	13.07			
2-APP012.79	3/17/1993	S	0.3	4.54	6.12	13.83			
2-APP012.79	4/19/1993	S	0.3	17.48	6.76	10.18			
2-APP012.79	5/18/1993	S	0.3	22.32	6.89	8.2			
2-APP012.79	6/10/1993	S	0.3	26.27	6.86	7.91			
2-APP012.79	7/19/1993	S	0.3	29	7.15	7.23			
2-APP012.79	8/16/1993	S	0.3	28.47	7.17	7.66			
2-APP012.79	9/14/1993	S	0.3	24.36	7.46	8.29			
2-APP012.79	10/12/1993	S	0.3	15.37	7.43	10.17			
2-APP012.79	11/3/1993	S	0.3	12.11	7.04	10.53			
2-APP012.79	12/8/1993	S	0.3	9.33	6.54	11.82			
2-APP012.79	1/18/1994	S	0.3	2.25	6.51	14.35			
2-APP012.79	2/3/1994	S	0.3	2.69	6.75	13.94			
2-APP012.79	3/1/1994	S	0.3	6.57	6.53	12.66			
2-APP012.79	4/5/1994	S	0.3	15.17	6.72	10.53			
2-APP012.79	5/3/1994	S	0.3	19.14	7.06	9.18			
2-APP012.79	6/1/1994	S	0.3	21.85	7.02	8.44			
2-APP012.79	7/6/1994	S	0.3	27.81	7.07	7.93			
2-APP012.79	8/2/1994	S	0.3	27.05	7.22	7.46			
2-APP012.79	9/7/1994	S	0.3	22.54	7.3	7.73			
2-APP012.79	10/4/1994	S	0.3	17.65	7.34	9.14			
2-APP012.79	11/8/1994	S	0.3	13.5	7.34	11.13			
2-APP012.79	12/12/1994	S	0.3	7.33	6.8	11.27			0
2-APP012.79	1/9/1995	S	0.3	5.95	7.27	12.62			
2-APP012.79	2/2/1995	S	0.3	5.82	6.88	12.3			
2-APP012.79	3/2/1995	S	0.3	6.27	7.06	12.65			
2-APP012.79	4/3/1995	S	0.3	12.03	7.01	10.91			

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	5/1/1995	S	0.3	16.7	7.07	8.87			
2-APP012.79	6/7/1995	S	0.3	23.77	6.99	7.97			
2-APP012.79	7/12/1995	S	0.3	26.12	6.72	7.4			
2-APP012.79	8/7/1995	S	0.3	28.4	7.18	6.44			
2-APP012.79	9/11/1995	S	0.3	24.68	7.2	7.03			
2-APP012.79	10/3/1995	S	0.3	21.79	7.5	8.31			
2-APP012.79	11/1/1995	S	0.3						
2-APP012.79	11/7/1995	S	0.3	12.95	6.82	10.12			
2-APP012.79	12/28/1995	S	0.3	1.99	6.92	13.64			
2-APP012.79	1/29/1996	S	0.3	3.77	6.63	12.94			
2-APP012.79	2/26/1996	S	0.3	7.35	6.58	12.86			
2-APP012.79	3/21/1996	S	0.3	9.55	6.47	12.17			
2-APP012.79	4/8/1996	S	0.3	11.87	6.05	10.44			
2-APP012.79	5/13/1996	S	0.3	17.99	7.14	8.76			
2-APP012.79	6/11/1996	S	0.3	22.27	7.1	8.02			
2-APP012.79	7/11/1996	S	0.3	26.06	7.27	8.12			
2-APP012.79	8/13/1996	S	0.3	24.06	7.05	7.55			
2-APP012.79	9/11/1996	S	0.3	24.17	6.41	7.67			
2-APP012.79	10/8/1996	S	0.3	16.5	6.3	8.92			
2-APP012.79	11/11/1996	S	0.3	12.81	6.94	10.12			
2-APP012.79	12/5/1996	S	0.3	7.98	6.55	12.01			
2-APP012.79	1/27/1997	S	0.3	3.14	6.59	14.4			
2-APP012.79	2/10/1997	S	0.3	5.04	7.04	14.42			
2-APP012.79	3/6/1997	S	0.3	11.18	7.02	12.44			
2-APP012.79	4/21/1997	S	0.3	13.86	7.23	9.8			
2-APP012.79	5/19/1997	S	0.3	19.43	6.94	8.28			
2-APP012.79	6/11/1997	S	0.3	20.66	7.03	9.42			
2-APP012.79	7/29/1997	S	0.3	28.73	7.15	6.8			
2-APP012.79	8/25/1997	S	0.3	24.37	8.17	7.37			
2-APP012.79	9/30/1997	S	0.3	20.93	7.95	9.05			
2-APP012.79	10/23/1997	S	0.3	15.61	7.32	11.4			
2-APP012.79	11/25/1997	S	0.3	7.91	7.29	11.74			
2-APP012.79	12/16/1997	S	0.3	5.63	6.86	12.83			
2-APP012.79	1/21/1998	S	0.3	5.82	7.4	12.57			
2-APP012.79	2/18/1998	S	0.3	7.88	6.77	12.09			
2-APP012.79	3/23/1998	S	0.3	8.59	6.26	11.85			
2-APP012.79	4/28/1998	S	0.3	16.7	7.41	10.12			
2-APP012.79	5/12/1998	S	0.3	17.54	7.04	9.54			
2-APP012.79	6/17/1998	S	0.3	24.22	7.4	7.92			
2-APP012.79	7/23/1998	S	0.3	28.81	7.21	7.18			
2-APP012.79	8/20/1998	S	0.3	24.13	7.21	7.04			
2-APP012.79	9/17/1998	S	0.3	26.99	7.96	7.77			
2-APP012.79	10/19/1998	S	0.3	18.33	7.59	8.69			
2-APP012.79	11/30/1998	S	0.3	10.49	7.2	9.94			
2-APP012.79	12/21/1998	S	0.3	10.48	7.24	11.33			
2-APP012.79	1/20/1999	S	0.3	4.38	6.81	12.07			
2-APP012.79	2/17/1999	S	0.3	6.83	7.42	9.55			
2-APP012.79	3/10/1999	S	0.3	6.71	7.1	12.53			
2-APP012.79	4/14/1999	S	0.3	15.52	7.08	8.56			
2-APP012.79	5/27/1999	S	0.3	20.44	7.02	8.59			
2-APP012.79	6/30/1999	S	0.3	27.23	7.01	7.27			
2-APP012.79	7/15/1999	S	0.3	23.37	7.04	8.57			
2-APP012.79	8/30/1999	S	0.3	25.64	7.23	7.38			0
2-APP012.79	9/23/1999	S	0.3	19.13	6.73	10.31			0
2-APP012.79	10/19/1999	S	0.3	16.66	7.2	9.53			0
2-APP012.79	11/9/1999	S	0.3	13.2	6.79	10.85			0
2-APP012.79	12/7/1999	S	0.3	8.62	6.17	4.81			0
2-APP012.79	1/6/2000	S	0.3	6.21	6.85	13			0

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	2/8/2000	S	0.3	2.39	6.97	14.38			0
2-APP012.79	3/9/2000	S	0.3	14.92	7.83	10.61			0
2-APP012.79	4/6/2000	S	0.3	13.56	6.74	10.18			0
2-APP012.79	5/8/2000	S	0.3	22.62	8.07	9.65			0
2-APP012.79	6/21/2000	S	0.3	25.53	7.04	7.66			
2-APP012.79	7/11/2000	S	0.3	26.73	6.99	7.73			0
2-APP012.79	8/15/2000	S	0.3	25.15	6.98	8.03			0
2-APP012.79	9/25/2000	S	0.3	22.01	7.45	7.64	8		0
2-APP012.79	10/18/2000	S	0.3	18.42	6.67	8.56			0
2-APP012.79	11/20/2000	S	0.3	10	7.48	11.35			0
2-APP012.79	12/19/2000	S	0.3	5.84	7.62	12.71			0
2-APP012.79	1/25/2001	S	0.3	3.78	6.95	13.18			0
2-APP012.79	2/12/2001	S	0.3	5.26	7.17	12.43			0
2-APP012.79	3/12/2001	S	0.3	9.51	7.41	12.42			0
2-APP012.79	4/26/2001	S	0.3						
2-APP012.79	5/9/2001	S	0.3	19.16	7.08	8.41			
2-APP012.79	7/11/2001	S	0.3	29.08	7.09	7.62			
2-APP012.79	9/11/2001	S	0.3	26.46	7.04	7.11			0
2-APP012.79	11/26/2001	S	0.3	14.41	7.36	9.41			0
2-APP012.79	1/10/2002	S	0.3	6.07	7.25	12.28			
2-APP012.79	3/11/2002	S	0.3	7.43	7.35	12.81			0
2-APP012.79	5/8/2002	S	0.3	21.5	7.3	8.84			0
2-APP012.79	8/14/2002	S	0.3	28.95	7.64	7.45			0
2-APP012.79	10/15/2002	S	0.3	18.86	6.97	7.7			0
2-APP012.79	11/19/2002	S	0.3	11.36	6.6	10.75			
2-APP012.79	12/4/2002	S	0.3	4.56	6.49	12.19			0
2-APP012.79	12/17/2002	S	0.3	4.36	6.89	13.71			
2-APP012.79	1/21/2003	S	0.3	3.16	7.27	12.73			
2-APP012.79	2/3/2003	S	0.3	3.66	7.22	13.43			0
2-APP012.79	2/20/2003	S	0.3	3.79	7.32	13.27			0
2-APP012.79	3/18/2003	S	0.3	11.77	7.23	11.14			0
2-APP012.79	4/15/2003	S	0.3	13.33	6.34	10.85			0
2-APP012.79	4/17/2003	S	0.3	15.57	6.78	9.84			0
2-APP012.79	5/27/2003	S	0.3	17.73	6.3	10.56			0
2-APP012.79	6/5/2003	S	0.3	20.35	6.69	10.1			0
2-APP012.79	6/24/2003	S	0.3	25.06	7.12	8.15			0
2-APP012.79	7/15/2003	S	0.3	27.22	7.38	7.78			0.02
2-APP012.79	7/21/2003	S	0.3	28.24	7.68	7.89			0
2-APP012.79	7/28/2003	S	0.3	28.8	7.74	7.96			0
2-APP012.79	8/20/2003	S	0.3	25.53	7.36	8.29			0
2-APP012.79	8/26/2003	S	0.3	27.87	7.53	7.6			0
2-APP012.79	9/24/2003	S	0.3	22.14	6.36	9.01			0
2-APP012.79	10/28/2003	S	0.3	15.58	7.49	9.5			0
2-APP012.79	10/29/2003	S	0.3	16.16	7.34	9.43			0
2-APP012.79	12/17/2003	S	0.3	5.15	6.68	13.01			0
2-APP012.79	2/19/2004	S	0.3	4.33	6.68	13.49			0
2-APP012.79	4/28/2004	S	0.3	19.78	7.97	10.09			0
2-APP012.79	6/8/2004	S	0.3	24.1	7.5	8.11	8.46		0
2-APP012.79	6/8/2004	S	0						
2-APP012.79	6/28/2004	S	0.3	26.04	6.96	7.57			0
2-APP012.79	9/22/2004	S	0.3	21.91	7.17	8.89			0
2-APP012.79	11/22/2004	S	0.3	10.31	7.27	10.31			0
2-APP012.79	1/31/2005	S	0.3	2.22	7.39	14.09			0
2-APP012.79	3/9/2005	S	0.3	6.18	7.97	13.19			0
2-APP012.79	5/31/2005	S	0.3	22.79	7.65	8.87			0
2-APP012.79	7/12/2005	S	0.3	27.87	7.45	7.7			0
2-APP012.79	9/19/2005	S	0.3	27.12	7.86	7.31			0
2-APP012.79	11/14/2005	S	0.3	14.46	8.1	9.93			0

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity
2-APP012.79	1/25/2006	S	0.3	7.34	7.54	12.73			0
2-APP012.79	3/23/2006	S	0.3	10.3	7.8	12.1			0
2-APP012.79	5/9/2006	S	0.3	18.2	7.7	9			0
2-APP012.79	7/12/2006	S	0.3	27.6	7.1	7.3			0
2-APP012.79	9/19/2006	S	0.3	22.3	7	8.2			0
2-APP012.79	11/15/2006	S	0.3	12.6	6.9	10.8			0
2-APP012.79	1/18/2007	S	0.3	6.4	6.7	12.9			
2-APP012.79	3/21/2007	S	0.3	8.7	7.2	12.3			0
2-APP012.79	5/11/2007	S	0.3	19.4	7.1	8.8			
2-APP012.79	5/30/2007	S	0.3	24.2	7.5	7.9			0
2-APP012.79	7/25/2007	S	0.3	24.8	7.6			8	0
2-APP012.79	9/19/2007	S	0.3						
2-APP012.79	11/26/2007	S	0.3	10.5	7.5	11.6			0
2-APP012.79	1/10/2008	S	0.3	6.6	6.6	12.4			
2-APP012.79	3/13/2008	S	0.3	10.2	7.3	11.2			0
2-APP012.79	3/27/2008	S	0.3	13.5	6.9	11.1			
2-APP012.79	5/7/2008	S	0.3	18.9	7.2	8.9			0
2-APP012.79	7/9/2008	S	0.3	25.4	7.5	6.9			0
2-APP012.79	9/15/2008	S	0.3	24.7	7.2	7.8			0
2-APP012.79	11/12/2008	S	0.3	11.6	7.3	10.8			0
2-APP012.79	2/12/2009	S	0.3	6.9	7.7	12.7			
2-APP012.79	4/8/2009	S	0.3	12.4	7.3	10.6			0
2-APP012.79	4/16/2009	S	0.3	15.2	7.8	10.9			
2-APP012.79	5/20/2009	S	0.3	19.1	7.3	8.1			
2-APP012.79	6/11/2009	S	0.3	24.9	5.7	6.5			
2-APP012.79	8/10/2009	S	0.3	28	7.5	6.8			0
2-APP012.79	10/7/2009	S	0.3	19.9	7.5	8.1			0
2-APP012.79	12/16/2009	S	0.3	5	6.2	13.3			0
2-APP012.79	1/11/2010	S	0.3	0.4	7.3	14.7			0
2-APP012.79	3/16/2010	S	0.3	10.3	7.3	11.3			0
2-APP012.79	5/19/2010	S	0.3	18.6	7.1	8.9			0
2-APP012.79	7/28/2010	S	0.3	26	7.4	7			0
2-APP012.79	9/22/2010	S	0.3	22.6	7.8	8.4			0
2-APP012.79	11/17/2010	S	0.3	13	7.1	10.3			0
2-APP012.79	1/20/2011	S	0.3	3.1	7.6	14.1			0
2-APP012.79	3/9/2011	S	0.3	10.6	7.4	11.8			0
2-APP012.79	5/5/2011	S	0.3	19	7.5	9			0
	90th Percentile (annual)			**27.0**	**8.0**				
	10th Percentile (annual)			**4.9**	**6.7**				
90th Percentile (wet season)				**19.5**					

Attachment B

Facility Flow Diagram

I-95 SOUTH BD.
I-95 NORTH BD.
WOODS
AERATION TANKS
SODIUM BISULFITE BLDG.
EFFLUENT STRUCTURE
CHLORINE CONTACT TANKS
AERATION TANK EFFLUENT DISTRIBUTION BOX, TYP OF 2
FINAL CLARIFIER NO. 1
POLYMER FEED/ELEC BUILDING
APPOMATTOX RIVER
CHLORINATION BUILDING
NO 3
NO 2
NO 1
BLOWER BUILDING
FINAL CLARIFIER NO. 2
RAS PUMP STATION
FINAL CLARIFIER NO. 3
MAGAZINE ROAD
MOTOR CONTROL AND PUMP BLDG NO.1
PRELIMINARY AND PRIMARY TREATMENT FACILITIES
LAB BUILDING
DIESEL TANK
BAR SCREENS
GRIT COLLECTORS
PRIMARY SETTLING TANKS
WOODS
NO. 1
NO. 2
SOLIDS STORAGE PAD
FINAL CLARIFIER NO.4
GENERATORS
CONTROL BUILDING
VEHICLE STORAGE BUILDING
DECANT TANKS
ODOR CONTROL AND PUMP BUILDING NO.2
PUMP BUILDING NO.3
HEAT PROCESS BUILDING
DIVERSION CHANNEL
SOLIDS FILTRATE PUMP STATION
SOLIDS CONDITIONING BUILDING
ALUM FEED FACILITIES
ALKALINE STABLIZATION FACILITIES
SOLIDS STORAGE TANKS
PROPERTY LINE

SITE PLAN
1"=150'-0"

HAZEN AND SAWYER
Environmental Engineers & Scientists
RALEIGH, NORTH CAROLINA

SOUTH CENTRAL WASTEWATER AUTHORITY
TREATMENT PLANT

PLANT LAYOUT

PIPE DESIGNATIONS

AL	ALUM
CAS	CAUSTIC
CS	CHLORINE
FCE	FINAL CLARIFIER EFFLUENT
FE	FINAL EFFLUENT
HS	HEAVY SOLIDS
ML	MIXED LIQUOR
P	POLYMER
PE	PRIMARY EFFLUENT
PS	PRIMARY SOLIDS
RAS	RETURN ACTIVATED SLUDGE
RS	RAW WASTEWATER
SB	SODIUM BISULFITE
SC	SCUM
TS	THICKENED SOLIDS
TWAS	THICKENED WASTE ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE

LEGEND

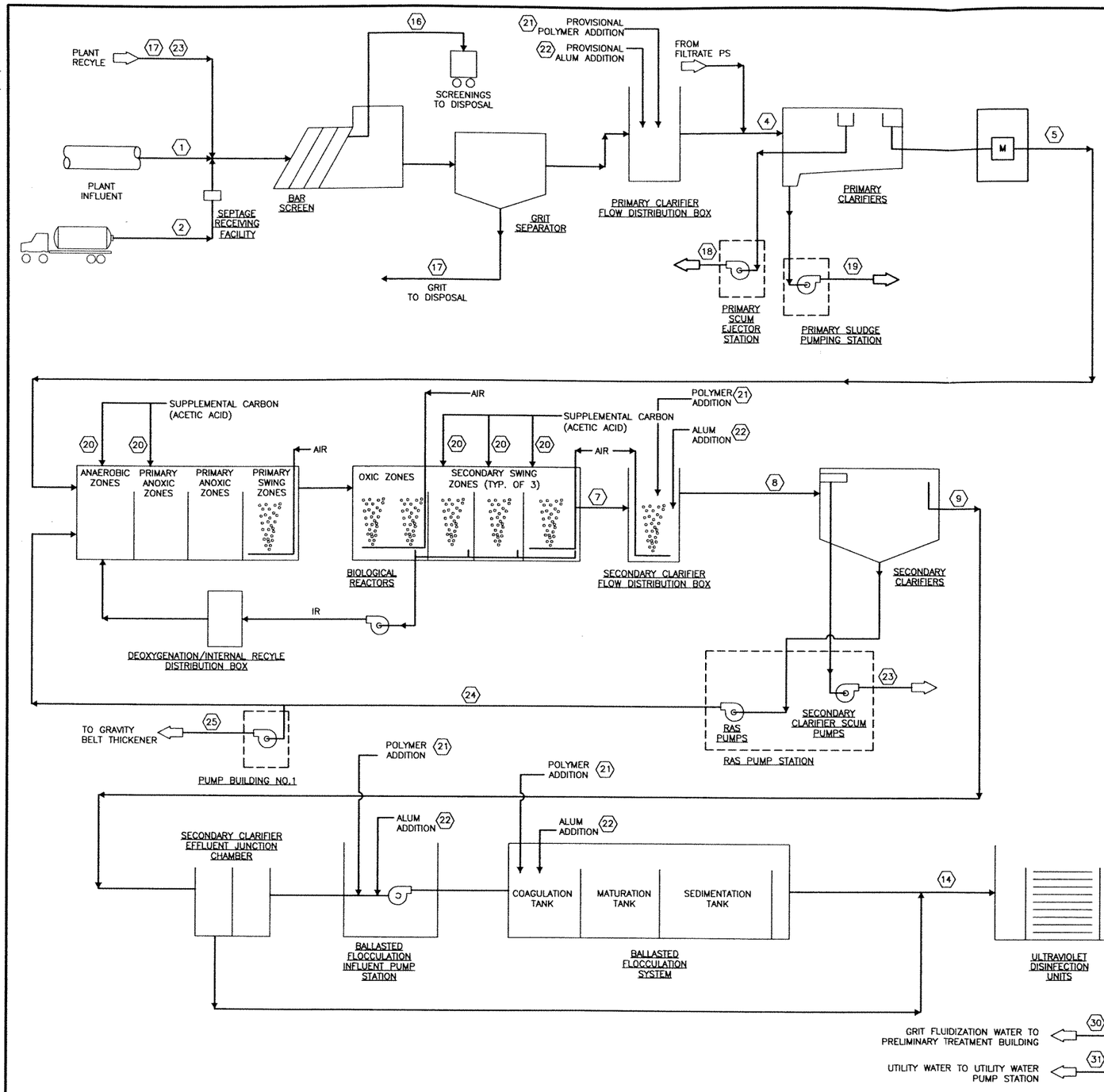
- DISSOLVED OXYGEN PROBE
- OXIDATION / REDUCTION POTENTIAL PROBE
- SAMPLER
- JET AERATOR
- PUMP
- MAGNETIC FLOW METER
- VALVE
- AIRFLOW METER

APPOMATTOX RIVER
FE
EFFLUENT METERING FLUME
SB
NPW PUMPS
CHLORINE CONTACT TANKS
FCE
JUNCTION BOX
CS
ML
FINAL CLARIFIERS
AERATION TANK EFFLUENT DISTRIBUTION BOX, TYP
P
AL
FROM BLOWERS
AIR
INFLUENT CHANNEL
COLLECTION/DISTRIBUTION CHANNEL
EFFLUENT CHANNEL
PE
AERATION TANKS
FINE BUBBLE AERATION, TYP
JET MIXING/AERATION, TYP
RAS
SC
WAS/HS
WAS
MECHANICAL BAR SCREEN
FROM COLLECTION SYSTEM
RS
MAIN PUMP STATION
FROM COLONIAL HEIGHTS PS
FROM POOR CREEK PS
GRIT COLLECTORS
MECHANICAL BAR SCREENS
CAUSTIC STORAGE
INFLUENT METERING FLUME
CAS
DUMPSTERS (TO LANDFILL)
GRIT CLASSIFIERS
SCUM CONCENTRATORS
ODOR SCRUBBER No. 2
PRIMARY SETTLING TANKS
PS
PUMP BLDG NO 1
PUMP BLDG NO 2
SOLIDS STORAGE TANK NO. 1
SOLIDS STORAGE TANK NO. 2
TS
TWAS
ALKALINE STABILIZATION FACILITIES
LIME
LIME SILOS
GRAVITY BELT THICKENERS
BELT FILTER PRESSES
SOLIDS CONDITIONING BUILDING
TO SOLIDS STORAGE PAD
RAS PUMP STATION

HAZEN AND SAWYER
Environmental Engineers & Scientists
RALEIGH, NORTH CAROLINA

SOUTH CENTRAL WASTEWATER AUTHORITY
TREATMENT PLANT

PROCESS FLOW SCHEMATIC



FLOW STREAM IDENTIFICATION		DESIGN									
		FLOW RATE MGD		BOD_5				TSS			
				MASS LBS/D		CONC MG/L		MASS LBS/D		CONC MG/L	
		AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	MAX MTH
1	RAW WASTEWATER	–	–	–	–	–	–	–	–	–	–
2	SEPTAGE	–	–	–	–	–	–	–	–	–	–
4	PRIMARY CLARIFIER INFLUENT	–	–	–	–	–	–	–	–	–	–
5	PRIMARY CLARIFIER EFFLUENT	–	–	–	–	–	–	–	–	–	–
7	BIOLOGICAL REACTOR EFFLUENT	–	–	–	–	–	–	–	–	–	–
8	SECONDARY CLARIFIER INFLUENT	–	–	–	–	–	–	–	–	–	–
9	SECONDARY CLARIFIER EFFLUENT	–	–	–	–	–	–	–	–	–	–
14	UV DISINFECTION INFLUENT	–	–	–	–	–	–	–	–	–	–
15	PLANT EFFLUENT	–	–	–	–	–	–	–	–	–	–
16	SCREENINGS TO DISPOSAL	–	–	–	–	–	–	–	–	–	–
17	GRIT TO DISPOSAL	–	–	–	–	–	–	–	–		
18	PRIMARY SCUM	–	–	–	–	–	–	–	–		
19	PRIMARY SLUDGE	–	–	–	–	–	–	–	–		
20	SUPPLEMENTAL CARBON (ACETIC ACID)	–	–	–	–	–	–	–	–		
21	POLYMER	–	–	–	–	–	–	–	–		
22	COAGULANT (ALUM)	–	–	–	–	–	–	–	–		
23	SECONDARY SCUM	–	–	–	–	–	–	–	–		
24	RAS	–	–	–	–	–	–	–	–		
25	WAS	–	–	–	–	–	–	–	–		
30	GRIT FLUIDIZATION WATER	–	–	–	–	–	–	–	–		
31	UTILITY WATER	–	–	–	–	–	–	–	–		

FLOW STREAM IDENTIFICATION		DESIGN									
		FLOW RATE MGD		TN				TP			
				MASS LBS/D		CONC MG/L		MASS LBS/D			
		AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	MAX MTH	AVG MTH	
1	RAW WASTEWATER	–	–	–	–	–	–	–	–		
4	PRIMARY CLARIFIER INFLUENT	–	–	–	–	–	–	–	–		
5	PRIMARY CLARIFIER EFFLUENT	–	–	–	–	–	–	–	–		
9	SECONDARY CLARIFIER EFFLUENT	–	–	–	–	–	–	–	–		
15	PLANT EFFLUENT	–	–	–	–	–	–	–	–		

LIQUID STREAM PROCESS FLOW DIAGRAM

NOTES:

1. THE PROCESS FLOW DIAGRAM DEPICTED ON THIS DRAWING PROVIDES A SCHEMATIC REPRESENTATION OF THE SYSTEM COMPONENTS FOR GENERAL REFERENCE. THE PROCESS FLOW DIAGRAM IS NOT INTENDED FOR CONSTRUCTION, UNLESS SPECIFICALLY REFERENCED FROM PLAN, SECTION OR DETAIL DRAWINGS FOR CONFIGURATION OR ARRANGEMENT.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 11/28/07

IN CHARGE OF WJM
DESIGNED BY SKB CHECKED BY ERT
DRAWN BY SKB

NOT TO SCALE

NO.	DATE	REVISION	INIT.

O'BRIEN & GERE

SOUTH CENTRAL WASTEWATER AUTHORITY
SCWWA WASTEWATER TREATMENT PLANT
NUTRIENT REDUCTION UPGRADE
PETERSBURG, VA

GENERAL
PROPOSED PLANT LIQUID
PROCESS FLOW DIAGRAM

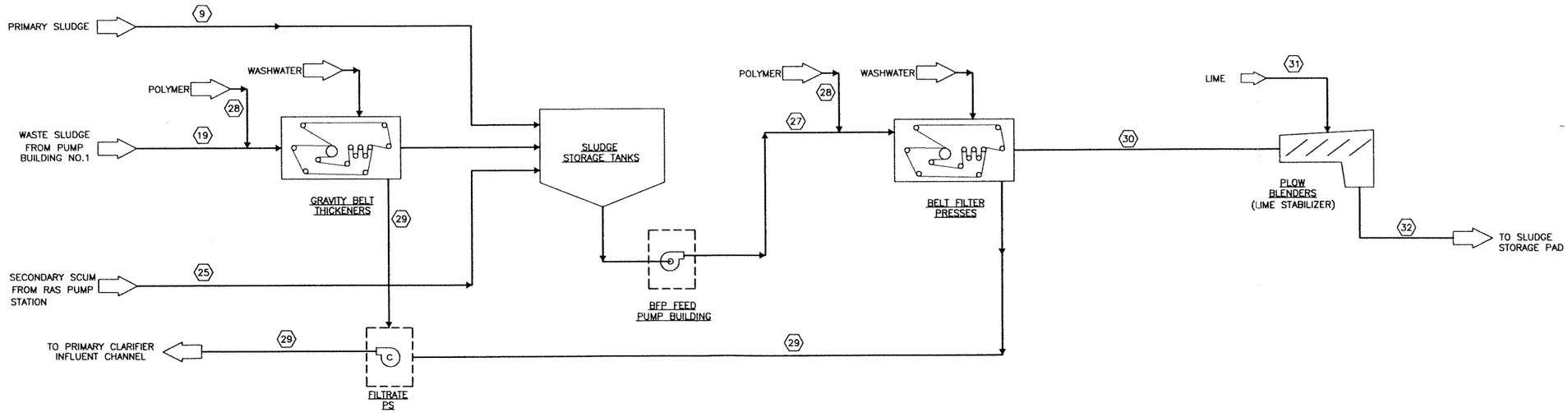
FILE NO. 12004.40098-1SK1
DATE OCTOBER 2007

1SK1

N:\40098 NR\9_DWGS\SHEETS\40098-1SK1.DWG

FLOW STREAM IDENTIFICATION	DESIGN (PHASE I)									
	FLOW RATE MGD		BOD_5*				TSS*			
			MASS LBS/D		CONC MG/L		MASS LBS/D		CONC MG/L	
	ANNUAL AVG.	MAX MON.	ANNUAL AVG.	MAX MON.	ANNUAL AVG.	MAX MON.	ANNUAL AVG.	MAX MON.	ANNUAL AVG.	MAX MON.
(9) PRIMARY SLUDGE	–	–	–	–	–	–	–	–	–	–
(19) WASTE SLUDGE TO GRAVITY BELT THICKENERS	–	–	–	–	–	–	–	–	–	–
(25) SCUM	–	–	–	–	–	–	–	–	–	–
(27) BELT FILTER PRESS FEED (W/WASH) (3)	–	–	–	–	–	–	–	–	–	–
(28) POLYMER	–	–	–	–	–	–	–	–	–	–
(29) GBT/BFP FILTRATE	–	–	–	–	–	–	–	–	–	–
(30) DEWATERED UNSTABILIZED CAKE (3)	–	–	–	–	–	–	–	–	–	–
(31) LIME	–	–	–	–	–	–	–	–	–	–
(32) STABILIZED SOLIDS TO DISPOSAL	–	–	–	–	–	–	–	–	–	–

(1) CY/D, 7–DAY WK. AVG.
(2) 24–HOUR OPERATION



SOLIDS STREAM PROCESS FLOW DIAGRAM

NOTES:
1. THE PROCESS FLOW DIAGRAM DEPICTED ON THIS DRAWING PROVIDES A SCHEMATIC REPRESENTATION OF THE SYSTEM COMPONENTS FOR GENERAL REFERENCE. THE PROCESS FLOW DIAGRAM IS NOT INTENDED FOR CONSTRUCTION, UNLESS SPECIFICALLY REFERENCED FROM PLAN, SECTION OR DETAIL DRAWINGS FOR CONFIGURATION OR ARRANGEMENT.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 11/28/07

IN CHARGE OF WJM
DESIGNED BY SKB CHECKED BY ERT
DRAWN BY SKB

NOT TO SCALE

NO.	DATE	REVISION	INIT.

O'BRIEN & GERE

SOUTH CENTRAL WASTEWATER AUTHORITY
SCWWA WASTEWATER TREATMENT PLANT
NUTRIENT REDUCTION UPGRADE
PETERSBURG, VA

MECHANICAL
PROPOSED PLANT SOLIDS
PROCESS FLOW DIAGRAM

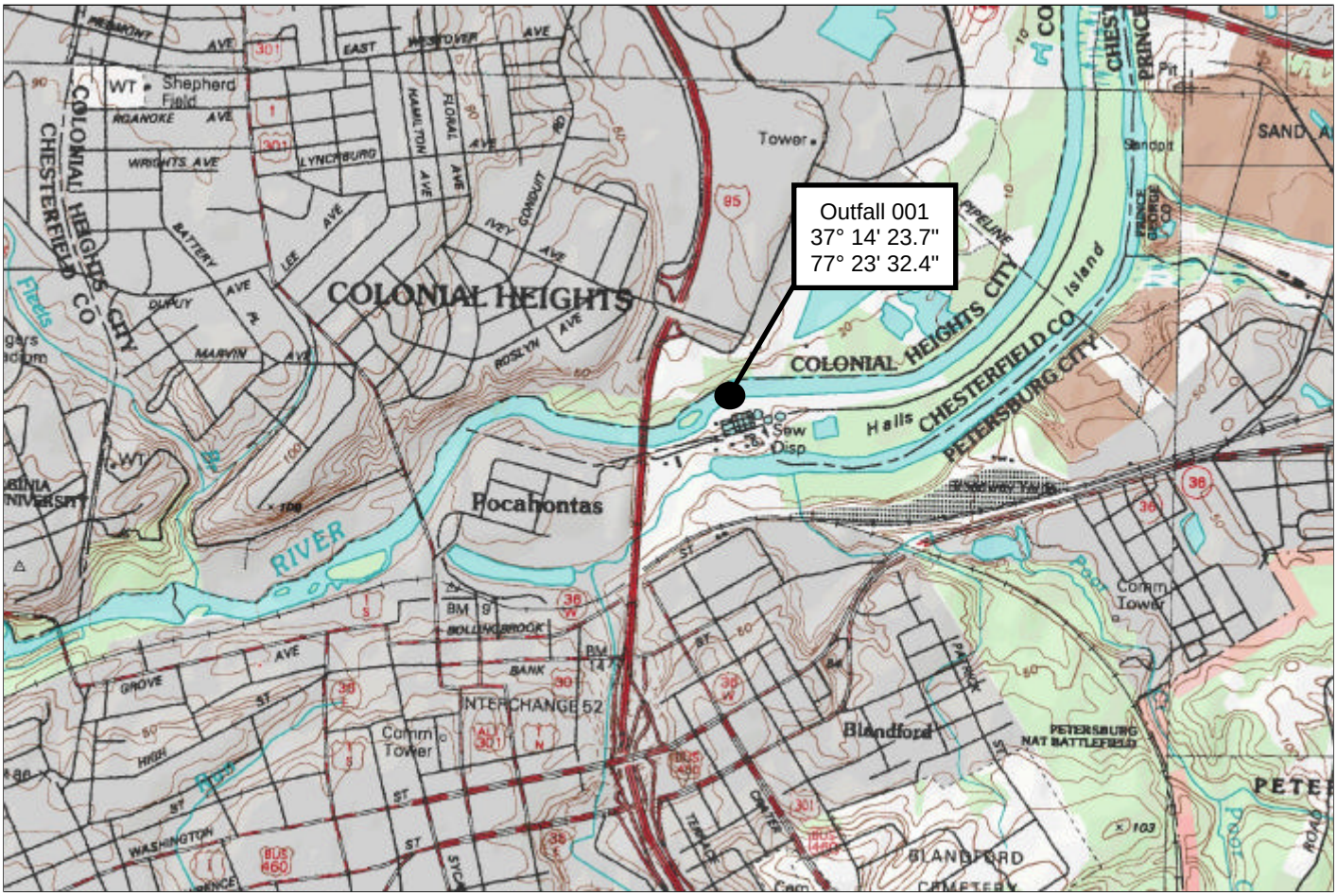
FILE NO. 12004.40098–1SK2
DATE OCTOBER 2007

1SK2

N:\40098 NRY9_DWGS\SHEETS\40098–1SK2.DWG

Attachment C

Topographic Map



Map provided by MyTopo.com

Attachment D

Site Inspection Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
PIEDMONT REGIONAL OFFICE
4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Doug Domenech
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

March 21, 2011

Mr. Alan Harrison, PE; Assistant Executive Director
South Central Wastewater Authority
900 Magazine Road
Petersburg, VA 23803

Re: Wastewater Facility and Laboratory Inspections; VPDES Permit No. VA0025437 and VAN040087 – South Central Wastewater Authority WWTP, Petersburg, VA

Dear Mr. Harrison,

Enclosed are the reports for the subject inspections performed on March 16, 2011. There are no recommendations with regard to the reports; therefore, a response is not required.

If you have questions regarding the reports, please contact me at (804) 527-5055.

Sincerely,

Mike Dare

Mike Dare
Environmental Inspector

Enclosure
CC: DEQ – File
Ray Burpoe
Drew Hammond
S. Stell
EPA Region III

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Wastewater Facility Inspection Report

Facility Name:	South Central Wastewater Authority	**Facility No.:**	VA0025437
City/County:	Petersburg	**Inspection Agency:**	DEQ
Inspection Date:	March 16, 2011	**Date Form Completed:**	March 17, 2011
Inspector:	Mike Dare, Drew Hammond M Dare 3-17-11	**Time Spent:**	12 hrs. w/ travel & report
Reviewed By:	3-17-11 KW 3/18/11	**Unannounced Insp.?**	No
		FY-Scheduled Insp.?	Yes

Present at Inspection: Ray Burpoe, Operations Manager

TYPE OF FACILITY:

Domestic		Industrial	
[ ] Federal	[x] Major	[ ] Major	[ ] Primary
[x] Non-Federal	[ ] Minor	[ ] Minor	[ ] Secondary

Population Served: 5 users – Petersburg, Colonial Heights, Pr. George Co., Chesterfield Co. and Dinwiddie Co.

Number of Connections: Approx. 24,366 residential connections

TYPE OF INSPECTION:

[x] Routine — Date of last inspection: July 21 & 23, 2009

[ ] Compliance — Agency: DEQ/PRO

[ ] Reinspection

EFFLUENT MONITORING:

Last month average: BOD: 258 mg/L TSS: 242 mg/L Flow: 10.463 MGD
(Influent) Date: *February 2011*
Other: Total P: 6.22 mg/l

Last month: CBOD: <QL mg/L TSS: 1.0 mg/L Flow: 10.128 MGD
(Effluent) Date: *February 2011*
Other: Total P: 1.43 mg/l

Quarter average: CBOD: <QL mg/L TSS: 1.03 mg/L Flow: 10.149 MGD
(Effluent) Date: December 2010 through February 2011
Other: TP: 1.27 mg/L

CHANGES AND/OR CONSTRUCTION

DATA VERIFIED IN PREFACE	[ ] Updated	[x] No changes	
Has there been any new construction?	[ ] Yes*	[x] No	
If yes, were plans and specifications approved?	[ ] Yes	[ ] No*	[x] N/A

DEQ approval date:

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: ***Class I – 6, Class II – 3, Class III - 3, Class IV – 2, OIT - 1***

2. Hours per day plant is staffed: ***24 hours/day; 7 days/week***

3.	Describe adequacy of staffing:	[x] Good	[ ] Average	[ ] Poor*
4.	Does the plant have an established program for training personnel?	[x] Yes	[ ] No	
5.	Describe the adequacy of the training program:	[x] Good	[ ] Average	[ ] Poor*
6.	Are preventive maintenance tasks scheduled?	[x] Yes	[ ] No*	
7.	Describe the adequacy of maintenance:	[x] Good	[ ] Average	[ ] Poor*
8.	Does the plant experience any organic/hydraulic overloading?	[x] Yes*	[ ] No	

If yes, identify cause and impact on plant: ***I & I during heavy downpours may cause spike flows.***

9.	Any bypassing since last inspection?	[ ] Yes*	[x] No	
10.	Is the on-site electric generator operational?	[x] Yes **(2)**	[ ] No*	[ ] N/A
11.	Is the STP alarm system operational?	[x] Yes	[ ] No *	[ ] N/A
12.	How often is the standby generator exercised?	[x] Weekly	[ ] Monthly	[ ] Other:
	Power Transfer Switch?	[x] Weekly	[ ] Monthly	[ ] Other:
	Alarm System?	[x] Weekly	[ ] Monthly	[ ] Other:

13. When were the cross connection control devices last tested on the potable water service? ***3 Devices; 6/2/10***

14. Is sludge disposed in accordance with the approved sludge disposal plan? [x] Yes [ ] No* [ ] N/A

15.	Is septage received by the facility?	[x] Yes	[ ] No	
	Is septage loading controlled?	[x] Yes	[ ] No *	[ ] N/A
	Are records maintained?	[x] Yes	[ ] No*	[ ] N/A
16.	Overall appearance of facility:	[x] Good	[ ] Average	[ ] Poor*

Comments: #4 Facility has a comprehensive training program which consists of the DEQ Courses, Sacramento Correspondence courses, Short School courses, Operator Certification classes at John Tyler CC, OJT, Equipment and Process Site Specific SOPs and cross training. AAWWP (contractor) training classes.

#11 All alarm systems are tied to the System Control and Data Acquisition System (SCADA) and the Sensaphone system that dials the lead operator.

#12 The two generators are tested and maintained by facility Instrumentation Group. Both generators run during times of peak energy need.

#14 Sludge, which is lime-stabilized, is land applied under contract with Recyc Systems Inc.

(B) PLANT RECORDS

1.	Which of the following records does the plant maintain?			
	Operational Logs for each unit process	[x] Yes	[ ] No*	[ ] N/A
	Instrument maintenance and calibration	[x] Yes	[ ] No*	[ ] N/A
	Mechanical equipment maintenance	[x] Yes	[ ] No*	[ ] N/A
	Industrial waste contribution **(Municipal Facilities)**	[x] Yes	[ ] No*	[ ] N/A
2.	What does the operational log contain?			
	Visual Observations	[x] Yes	[ ] No	[ ] N/A
	Flow Measurement	[x] Yes	[ ] No	[ ] N/A
	Laboratory Results	[x] Yes	[ ] No	[ ] N/A
	Process Adjustments	[x] Yes	[ ] No*	[ ] N/A
	Control Calculations	[x] Yes	[ ] No	[ ] N/A
	Other:	___		
3.	What do the mechanical equipment records contain:			
	As built plans and specs?	[x] Yes	[ ] No*	[ ] N/A
	Spare parts inventory?	[x] Yes	[ ] No*	[ ] N/A
	Manufacturers instructions?	[x] Yes	[ ] No*	[ ] N/A
	Equipment/parts suppliers?	[x] Yes	[ ] No*	[ ] N/A
	Lubrication schedules?	[x] Yes	[ ] No*	[ ] N/A
	Other:	___		
	Comments:	None		
4.	What do the industrial waste contribution records contain:	***(Applicable to municipal facilities only)***		
	Waste characteristics?	[x] Yes	[ ] No*	[ ] N/A
	Locations and discharge types?	[x] Yes	[ ] No*	[ ] N/A
	Impact on plant?	[ ] Yes	[ ] No*	[x] N/A
	Other:	N/A		
	Comments:	None		
5.	Are the following records maintained at the plant:			
	Equipment maintenance records	[x] Yes	[ ] No*	[ ] N/A
	Operational Log	[x] Yes	[ ] No*	[ ] N/A
	Industrial contributor records	[x] Yes	[ ] No*	[ ] N/A
	Instrumentation records	[x] Yes	[ ] No*	[ ] N/A
	Sampling and testing records	[x] Yes	[ ] No*	[ ] N/A
6.	Are records maintained at a different location?	[ ] Yes	[x] No	
	Where are the records maintained?	***All are available on site.***		
7.	Were the records reviewed during the inspection	[ ] Yes	[x] No	
8.	Are the records adequate and the O & M Manual current?	[x] Yes	[ ] No*	[ ] N/A
	O&M Manual date written: ***June 1997; supplement for chlorine and dechlor. 6/02***			
	Date DEQ approved O&M: ***10/29/97; supplement 8/5/02***			
9.	Are the records maintained for required 3-year period?	[x] Yes	[ ] No*	

Comments: Weekly work orders are automatically generated and then distributed by the Stock Control Clerk. A backup card file is maintained. When work is completed, the work orders are returned to and maintained by the Stock Control Clerk. Requests for repairs are similarly documented.

(C) SAMPLING

1.	Are sampling locations capable of providing representative samples?	[x] Yes	[ ] No*	[ ] N/A
2.	Do sample types correspond to those required by the permit?	[x] Yes	[ ] No*	[ ] N/A
3.	Do sampling frequencies correspond to those required by the permit?	[x] Yes	[ ] No*	[ ] N/A
4.	Are composite samples collected in proportion to flow?	[x] Yes	[ ] No*	[ ] N/A
5.	Are composite samples refrigerated during collection?	[x] Yes	[ ] No*	[ ] N/A
6.	Does plant maintain required records of sampling?	[x] Yes	[ ] No*	[ ] N/A
7.	Does plant run operational control tests?	[x] Yes	[ ] No*	[ ] N/A

Comments: Access points for sample collection are installed on each of the 3 force mains coming into the plant: Poore Creek, Colonial Heights and Petersburg.

(D) TESTING

1. Who performs the testing?
   [x] Plant/ Lab
   [ ] Central Lab
   [x] Commercial Lab - Name: ***Air, Water & Soil (TKN, TN, NO2-NO3, metals), HRSD (permit renewal testing), Coastal Bioanalysts, Inc. (wet)***

If plant performs any testing, complete 2-4.

2.	What method is used for chlorine analysis?	***Hach Pocket Colorimeter II***		
3.	Is sufficient equipment available to perform required tests?	[x] Yes	[ ] No*	[ ] N/A
4.	Does testing equipment appear to be clean and/or operable?	[x] Yes	[ ] No*	[ ] N/A

Comments: Please see enclosed DEQ *Laboratory Inspection Report*.

(E) FOR INDUSTRIAL FACILITIES W/ TECHNOLOGY BASED LIMITS N/A

1. Is the production process as described in the permit application? (If no, describe changes in comments)
   [ ] Yes [ ] No* [x] N/A
2. Do products and production rates correspond to the permit application? (If no, list differences in comments section)
   [ ] Yes [ ] No* [x] N/A
3. Has the State been notified of the changes and their impact on plant effluent?
   [ ] Yes [ ] No* [x] N/A

Comments: None

FOLLOW UP TO COMPLIANCE RECOMMENDATIONS FROM THE July 21 & 23, 2009 DEQ INSPECTION:

1. There were no compliance recommendations.

FOLLOW UP TO GENERAL RECOMMENDATIONS FROM THE July 21 & 23, 2009 DEQ INSPECTION:

1. There were no general recommendations.

INSPECTION REPORT SUMMARY

Compliance Recommendations/Request for Corrective Action:

1. There are no compliance recommendations at this time.

General Recommendations/Observations:

1. There are no general recommendations at this time.

Comments:

South Central Wastewater Authority personnel are once again commended for the meticulous manner in which the plant is maintained. A number of proactive systems have been designed and installed by SCWWA personnel that reduce unscheduled maintenance and protect the environment.

Pump stations are maintained by the cities of Petersburg and Colonial Heights, and the Counties of Chesterfield, Dinwiddie and Prince George.

A plant upgrade, currently in the planning stage, will add 4 bar screen channels, a new grit collection system, UV disinfection, 3 additional final clarifiers, 2 high rate flocculators and 6 rotary fan presses (that will replace the gravity belt thickeners and belt filter presses).

Items evaluated during this inspection include (check all that apply):

[x] Yes	[ ] No		Operational Units
[ ] Yes	[x] No		O & M Manual
[x] Yes	[ ] No		Maintenance Records
[x] Yes	[ ] No	[ ] N/A	Pathogen Reduction & Vector Attraction Reduction
[x] Yes	[ ] No	[ ] N/A	Sludge Disposal Plan
[ ] Yes	[ ] No	[x] N/A	Groundwater Monitoring Plan
[ ] Yes	[ ] No	[x] N/A	Storm Water Pollution Prevention Plan
[x] Yes	[ ] No	[ ] N/A	Permit Special Conditions
[ ] Yes	[x] No	[ ] N/A	Permit Water Quality Chemical Monitoring
[x] Yes	[ ] No	[ ] N/A	Laboratory Records (see Lab Report)

UNIT PROCESS: Sewage Pumping

1. Name of station: ***Drain Pump Station***
2. Location (if not at STP): ***Adjacent to and serving the headworks***
3. Following equipment operable:
   - a. All pumps? [x] Yes *(2)* [ ] No*
   - b. Ventilation? [x] Yes [ ] No* [ ] N/A
   - c. Control system? [x] Yes [ ] No* [ ] N/A
   - d. Sump pump? [ ] Yes [ ] No* [x] N/A
   - e. Seal water system? [ ] Yes [ ] No* [x] N/A

4. Reliability considerations:
   - a. Class [x] I [ ] II [ ] III
   - b. Alarm system operable? [x] Yes [ ] No [ ] N/A
   - c. Alarm conditions monitored:
     1. high water level: [x] Yes [ ] No* [ ] N/A
     2. high liquid level in dry well: [ ] Yes [ ] No* [x] N/A
     3. main electric power: [ ] Yes [ ] No* [x] N/A
     4. auxiliary electric power: [ ] Yes [ ] No* [x] N/A
     5. failure of pump motors to start: [ ] Yes [ ] No* [x] N/A
     6. test function: [x] Yes [ ] No*
     7. other: N/A
   - d. Backup for alarm system operational? [ ] Yes [ ] No* [x] N/A
   - e. Alarm signal reported to (identify): ***local audible & visual, SCADA system, and Sensaphone***
   - f. Continuous operability provisions:
     1. Generator hook up? [x] Yes [ ] No **(2 on site generators)**
     2. Two sources of electricity? [x] Yes [ ] No **(dual feed)**
     3. Portable pump? [ ] Yes [x] No
     4. 1 day storage? [ ] Yes [x] No
     5. other: N/A

5. Does station have bypass? [ ] Yes* [x] No
   - a. Evidence of bypass use? [ ] Yes* [ ] No [x] N/A
   - b. Can bypass be disinfected? [ ] Yes [ ] No* [x] N/A
   - c. Can bypass be measured? [ ] Yes [ ] No* [x] N/A

6. How often is station checked? ***At least twice a day***

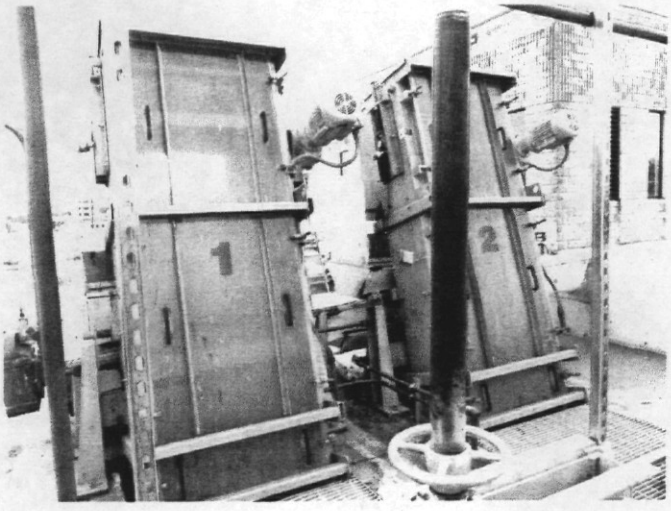
7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Station receives wastewater from the air-scrubber system, seal water from the primary pumps, containment basin for the primary clarifier scum pots and caustic storage area, and wash down from the floor drains in the headworks complex. Wastewater from this station is returned to the headworks.

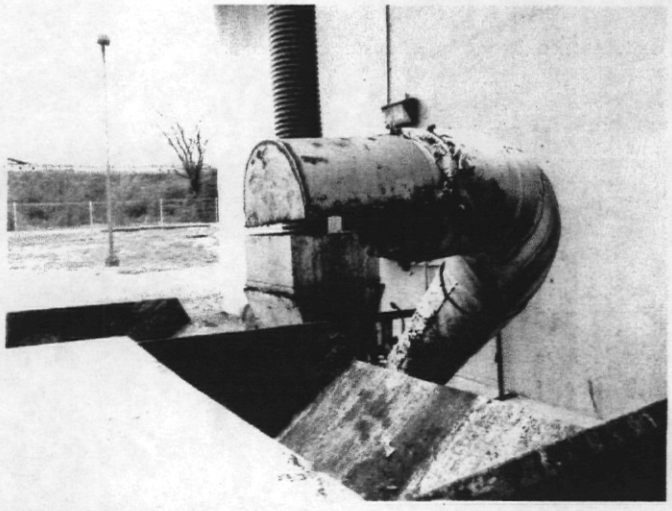
UNIT PROCESS: Screening/Comminution

1.	Number of units:	Manual: *0*	Mechanical: *2 (in parallel)*	
	Number of units in operation:	Manual: *0*	Mechanical: *1*	
2.	Bypass channel provided?	[ ] Yes	[x] No	
	Bypass channel in use?	[ ] Yes	[ ] No	[x] N/A
3.	Area adequately ventilated?	[x] Yes	[ ] No*	
4.	Alarm system for equipment failure or overloads?	[x] Yes	[ ] No	[ ] N/A
	If present, is the alarm system operational?	[x] Yes	[ ] No *	[ ] N/A
5.	Proper flow-distribution between units?	[x] Yes	[ ] No *	[ ] N/A
6.	How often are units checked and cleaned?	*checked at least 3 – 4X per 12 hr. shift*		
7.	Cycle of operation:	*differential with timer backup*		
8.	Volume of screenings removed:	*~ 1.5 cubic yards/day*		
9.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: The screens discharge to a common conveyor and screenings press, which dumps directly into a dumpster.



Screens

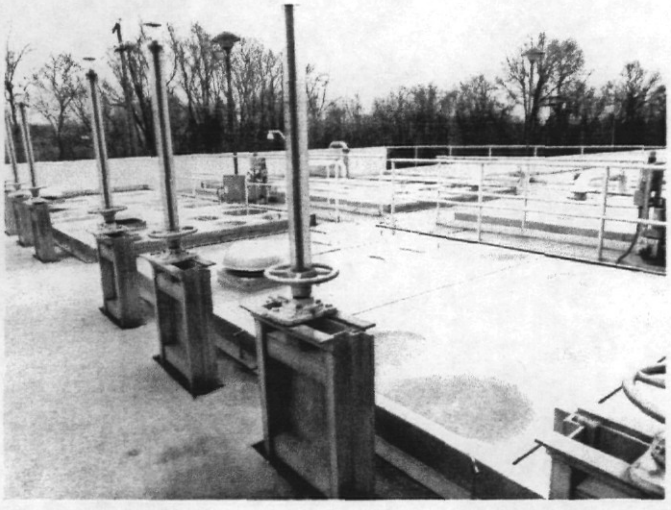


Discharge of screenings press

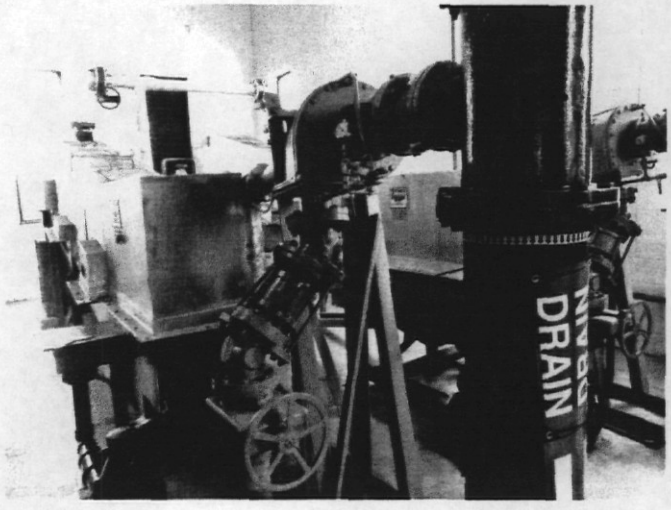
UNIT PROCESS: Grit Removal

1.	Number of units:	***2 (covered grit settling tanks)***		
	Number of units in operation:	***2***		
2.	Unit adequately ventilated?	[x] Yes	[ ] No *	
3.	Operation of grit collection equipment:	[ ] Manual	[ ] Time clock	[x] Continuous duty
4.	Proper flow-distribution between units?	[x] Yes	[ ] No *	[ ] N/A
5.	Daily volume of grit removed:	***~ 1.5 cubic yards/day***		
6.	All equipment operable?	[x] Yes	[ ] No *	
7.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: These units are covered as part of the odor control system. Grit handling equipment includes three grit pumps and two cyclone separators. Two grit pumps were online. The water from the cyclone separators returns to the grit channels, the solids go to the two variable speed grit classifiers. Two blowers operate in lead/lag mode to aerate the channel between the grit channels and clarifiers. Grit drops from the classifiers through chutes to a dumpster below.



Grit settling tanks (2) in foreground



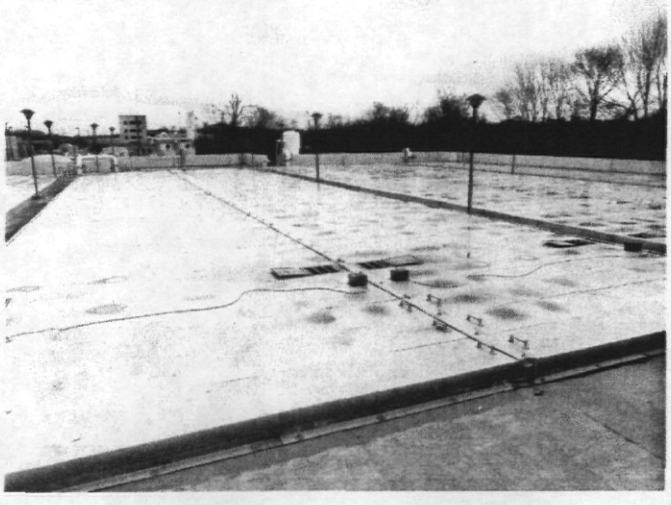
Grit classifiers

UNIT PROCESS: Sedimentation

[x] Primary [ ] Secondary [ ] Tertiary

1.	Number of units:	***3***		
	In operation:	***2***		
2.	Proper flow-distribution between units?	[x] Yes	[ ] No*	[ ] N/A
3.	Signs of short-circuiting and/or overloads?	[ ] Yes*	[x] No	
4.	Effluent weirs level?	[x] Yes	[ ] No*	[ ] N/A
	Clean?	[x] Yes	[ ] No*	
5.	Scum-collection system working properly?	[x] Yes	[ ] No*	[ ] N/A
6.	Sludge-collection system working properly?	[x] Yes	[ ] No*	[ ] N/A
h.	Influent, effluent baffle systems working properly?	[x] Yes	[ ] No*	[ ] N/A
8.	Chemical addition?	[ ] Yes	[x] No	
	Chemicals:	None		
9.	Effluent characteristics:	***Turbid - normal***		
10.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: Two clarifiers are in service during normal flows. All three units were available for use at the time of inspection.



Primary clarifiers are covered as part of the odor control system. Skew switches (above) have been installed to alert Operators to an out-of-skew condition of the flight chains.

UNIT PROCESS: Sludge Pumping

(Primary Sludge to Sludge Holding Tank)

1. Number of Pumps: ***5***

   Number of pumps in operation: ***2***

2. Type of sludge pumped: [x] Primary [ ] Secondary [ ] Return Activated
   [ ] Combination [ ] Other:

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift
   [ ] Centrifugal [x] Progressing cavity [ ] Other:_____

4. Mode of operation: [ ] Manual [x] Automatic [ ] Other:_____

5. Sludge volume pumped: ***35,713 gals/day (daily avg. for 2/11)***

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Sludge from the primary clarifiers is pumped to the Sludge Holding Tank where it combines with thickened (Gravity Belt Thickener) waste activated sludge. A "pigging station" is installed to allow for routine pigging of sludge line to help reduce line blockages.

UNIT PROCESS: Flow Measurement

(Primary Clarifier Effluent)

[ ] Influent [x] Intermediate [ ] Effluent

1.	Type measuring device:	***60" Parshall flume with ultrasonic differential***
2.	Present reading:	***Instantaneous: 17.9 MGD (at time of inspection)***
3.	Bypass channel?	[ ] Yes [x] No
	Metered?	[ ] Yes [ ] No* [x] N/A
4.	Return flows discharged upstream from meter?	[x] Yes [ ] No
	If Yes, identify:	***gravity belt thickener and belt filter press filtrate, septage receiving unit***
5.	Device operating properly?	[x] Yes [ ] No*
6.	Date of last calibration:	***12/16/09***
7.	Evidence of following problems:	
	a. Obstructions?	[ ] Yes* [x] No
	b. Grease?	[ ] Yes* [x] No
8.	General condition:	[x] Good [ ] Fair [ ] Poor*

Comments: None

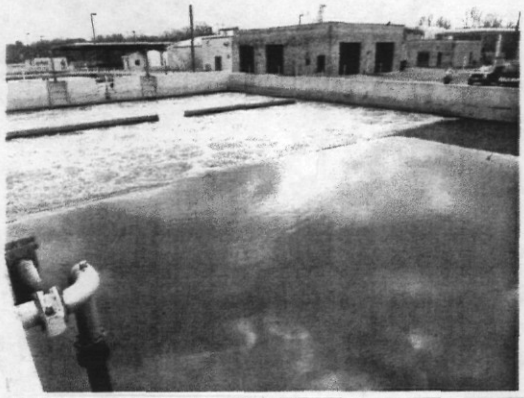
UNIT PROCESS: Activated Sludge Aeration

1. Number of units: ***3 - three stage trains***
   Number of units in operation: ***2 trains***
2. Mode of operation: ***Activated Sludge w/ammonia removal***
3. Proper flow distribution between units? [x] Yes [ ] No* [ ] N/A
4. Foam control operational? [ ] Yes [ ] No* [x] N/A
5. Scum control operational? [ ] Yes [ ] No* [x] N/A
6. Evidence of the following problems:
   a. Dead spots? [ ] Yes* [x] No
   b. Excessive foam? [ ] Yes* [x] No
   c. Poor aeration? [ ] Yes* [x] No
   d. Excessive aeration? [ ] Yes* [x] No
   e. Excessive scum? [ ] Yes* [x] No
   f. Aeration equipment malfunction? [ ] Yes* [x] No
   g. Other:
7. Mixed liquor characteristics (as available) ***average or range for February 2011***

pH:	***6.3 – 7.1 SU***	MLSS:	***3401 mg/L***
DO:	***0.1 – 7.0 mg/L***	SDI:	
SVI:	***50***	Color:	***Gray-Brown***
Odor:	***earthy***	Settleability:	***149 ml/l***
		Other:	***MLVSS 2799 mg/L, F/M 0.2, SRT 17***

8. Return/waste sludge:
   a. return rate: ***7.4 MGD; 73%***
   b. waste rate: ***0.148 MGD (to GBT)***
   c. frequency of wasting: ***continuous***
9. Aeration system control: [ ] Time Clock [ ] Manual [x] Continuous [ ] Other
10. Effluent control devices working properly ***(oxidation ditches)***? [ ] Yes [ ] No [x] N/A
11. General condition: [x] Good [ ] Fair [ ] Poor *

Comments: Each train consists of 3 cells (A, B and C - in series). Cell A is typically operated as an anaerobic zone but can be aerated if needed. Cells B and C are aerated. Nitrification and some phosphorus removal is achieved with this system. Alum is typically required for further phosphorus reduction. Polymer and alum are added as required just prior to the secondary clarifiers. Five blowers are available; one was on line; all were operational – they are rotated weekly. Photo at left is of cell A (front) and cell B (rear). Photo at right is of cell C.



UNIT PROCESS: Sedimentation

[ ] Primary [x] Secondary [ ] Tertiary

1.	Number of units:	*4*		
	In operation:	*3*		
2.	Proper flow-distribution between units?	[x] Yes	[ ] No*	[ ] N/A
3.	Signs of short-circuiting and/or overloads?	[ ] Yes*	[x] No	
4.	Effluent weirs level?	[x] Yes	[ ] No*	[ ] N/A
	Clean?	[x] Yes	[ ] No*	
5.	Scum collection system working properly?	[x] Yes	[ ] No*	[ ] N/A
6.	Sludge-collection system working properly?	[x] Yes	[ ] No*	[ ] N/A
7.	Influent, effluent baffle systems working properly?	[x] Yes	[ ] No*	[ ] N/A
8.	Chemical addition?	[x] Yes	[ ] No	
	Chemicals:	*Alum and polymer are fed as required at the end of the aeration basins.*		
9.	Effluent characteristics:	*Clear*		
10.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: One clarifier was out of service but available.

Above photos are of one of the three in-service clarifiers. Polymer was not being added at the time of inspection.

UNIT PROCESS: Sludge Pumping

(RAS)

1. Number of Pumps: *5*
   Number of pumps in operation: *3*

2. Type of sludge pumped: [ ] Primary [ ] Secondary [x] Return Activated [ ] Combination [ ] Other:

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [x] Centrifugal [ ] Progressing cavity [ ] Other:

4. Mode of operation: [ ] Manual [x] Automatic [ ] Other:

5. Sludge volume pumped: *7.4 MGD (avg. for 2/11)*

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Pumping rates are based on flow and operational test results.

UNIT PROCESS: Sludge Pumping

(WAS valved off RAS line to Gravity Belt Thickener)

1. Number of Pumps: *2*
   Number of pumps in operation: *1*

2. Type of sludge pumped: [ ] Primary [x] Secondary [ ] Return Activated [ ] Combination [ ] Other:

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [x] Centrifugal [ ] Progressing cavity [ ] Other:

4. Mode of operation: [ ] Manual [x] Automatic [ ] Other:

5. Sludge volume pumped: *0.121 MGD (avg. GBT feed rate for 2/11)*

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: None

UNIT PROCESS: Sludge Pumping

(Scum from Secondary Clarifiers)

1. Number of Pumps: 1

   Number of pumps in operation: 1

2. Type of sludge pumped: [ ] Primary [ ] Secondary [ ] Return Activated [ ] Combination [x] Other: ***secondary clarifier scum***

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [ ] Centrifugal [ ] Progressing cavity [x] Other: Piston Pump

4. Mode of operation: [x] Manual [ ] Automatic [ ] Other:

5. Sludge volume pumped: not measured

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: None

UNIT PROCESS: Pressure Filtration (Sludge)

(Gravity Belt Thickener)

1. Number of units: ***2***

   Number In operation: ***1***

2. Percent solids in influent sludge: ***0.69 % 2/11 daily average***

3. Percent solids in discharge cake: ***6.68 % 2/11 daily average***

4. Filter run time: ***24 hrs./day***

5. Amount cake produced: ***7,834 lbs./day of thickened sludge to Sludge H T (2/11)***

6. Conditioning chemicals used: [x] Yes [ ] No

   Type and Dose: ***Mannich polymer – 4.4 dry lbs/ton***

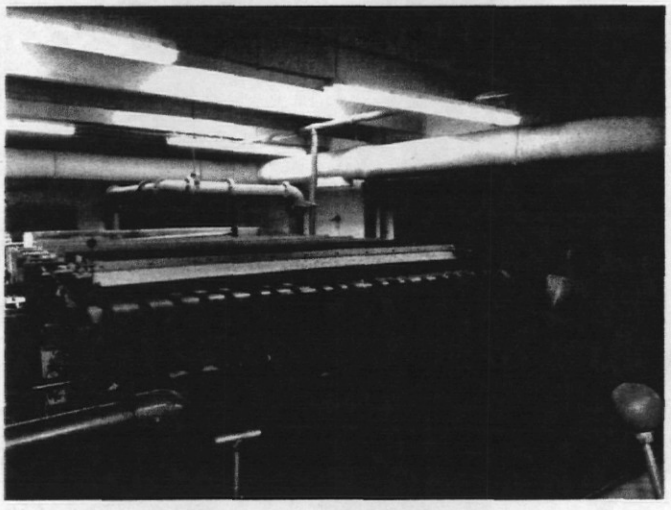
7. Sludge pumping: [x] ***Manual start with automatic rate control*** [ ] Automatic

8. Recirculating system included on acid wash: [ ] Yes [ ] No [x] N/A

9. Signs of overloads? [ ] Yes * [x] No

10. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Polymer is injected into the sludge feed line. Thickened sludge is pumped to the Sludge Holding tank where it is mixed with primary clarifier sludge prior to the Belt Filter Press.



Gravity belt thickener

UNIT PROCESS: Sludge Pumping

(Thickened WAS from GBT to Sludge Holding Tank)

1. Number of Pumps: 2
   Number of pumps in operation: 1

2. Type of sludge pumped: [ ] Primary [ ] Secondary [ ] Return Activated
   [ ] Combination [x] Other: ***Thickened WAS***

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift
   [ ] Centrifugal [ ] Progressing cavity [x] Other: Mono

4. Mode of operation: [ ] Manual [x] Automatic [ ] Other:

5. Sludge volume pumped: ***7,834 lbs/day (2/11)***

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

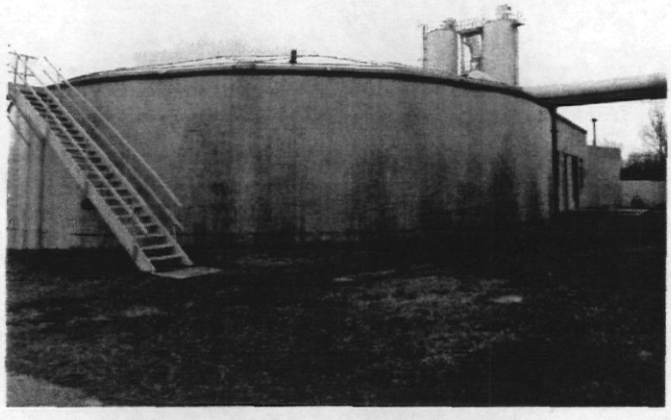
7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Gravity belt thickened waste activated sludge and primary sludge are combined in the Sludge Holding Tank, then pumped to the Belt Filter Presses for dewatering.

UNIT PROCESS: Sludge Holding Tank

1. Number of units: 2
   Number of units in operation: 1
2. Type of sludge treated: ***Unit #1: Gravity Belt Thickened WAS and Primary Sludge. Unit #2: Emergency Storage Tank, if needed***
3. Frequency of sludge application to holding tank: ***Daily***
4. Supernatant return rate: ***N/A***
5. pH adjustment provided? [ ] Yes [x] No
   Utilized: [ ] Yes [ ] No [x] N/A
6. Tank contents well-mixed and relatively free of odors? [x] Yes [ ] No*
7. If diffused aeration is used, do diffusers require frequent cleaning? [ ] Yes [x] No [ ] N/A
8. Location of supernatant return: [ ] Head [ ] Primary [x] Other N/A
9. Process control testing: N/A - Not Monitored
   a. percent volatile solids: [ ] Yes _____ % [ ]No
   b. pH: [ ] Yes _____ SU [ ] No
   c. alkalinity: [ ] Yes _____ mg/L [ ] No
   d. dissolved oxygen: [ ] Yes _____ mg/L [ ] No
10. Foaming problem present? [ ] Yes * [x] No
11. Signs of short-circuiting or overloads?: [ ] Yes * [x] No
12. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Two former aerobic digesters were converted to an aerated Sludge Holding Tank and a non-aerated Emergency Holding Tank. Primary sludge and thickened WAS combine in-line prior to entering the Sludge Holding Tank.



Aerated sludge holding tank is in foreground; Emergency sludge holding tank is in background at far right.

UNIT PROCESS: Sludge Pumping

(Sludge Holding Tank Recirculation Pump)

1. Number of Pumps: *2*
   Number of pumps in operation: *1*

2. Type of sludge pumped: [ ] Primary [ ] Secondary [ ] Return Activated [x] Combination [ ] Other:

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [x] Centrifugal [ ] Progressing cavity [ ] Other:

4. Mode of operation: [x] Manual [ ] Automatic [ ] Other:

5. Sludge volume pumped: N/A

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

Comments: Two old decant pumps are still in place and serve as standby recirculation pumps.

UNIT PROCESS: Sludge Pumping

(Pumping from Sludge Holding Tank to the Belt Filter Press)

1. Number of Pumps: *2*
   Number of pumps in operation: *1*

2. Type of sludge pumped: [ ] Primary [ ] Secondary [ ] Return Activated [x] Combination [ ] Other:

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [ ] Centrifugal [x] Progressing cavity [ ] Other:

4. Mode of operation: [ ] Manual [x] Automatic [ ] Other:

5. Sludge volume pumped: *0.074 MGD (2/11)*

6. Alarm system for equipment failures or overloads operational? [x] Yes [ ] No* [ ] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor*

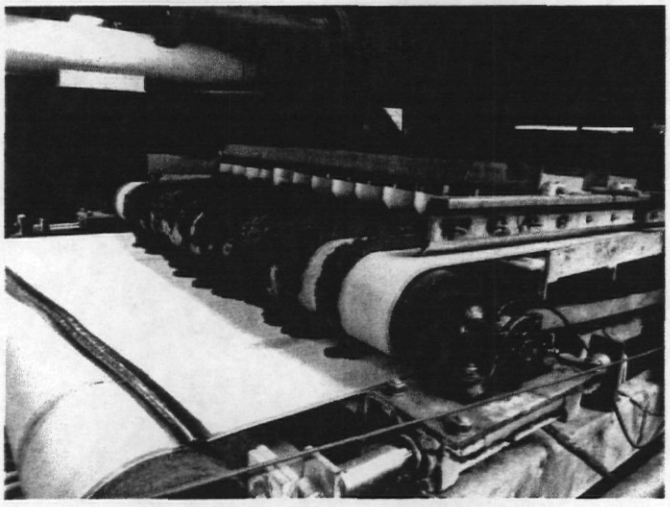
Comments: None

UNIT PROCESS: Pressure Filtration (Sludge)

(Belt Filter Press)

1.	Number of units:	*2*
	Number In operation:	*1*
2.	Percent solids in influent sludge:	*3.11 % (2/11 average)*
3.	Percent solids in discharge cake:	*22.7 % w/o lime / 27.6% w/lime (2/11 average)*
4.	Filter run time:	*16.44 hours/day (2/11)*
5.	Amount cake produced:	*225 dry tons/Mo w/lime; 171 dry tons/Mo w/o lime (2/11)*
6.	Conditioning chemicals used:	[x] Yes [ ] No
	Type and Dose:	*Mannich Polymer – 5.7 lbs./dry ton sludge in 2/11*
7.	Sludge pumping:	[x] *Manual start with automatic flow rate control* [ ] Automatic
8.	Recirculating system included on acid wash:	[ ] Yes [ ] No [x] N/A
9.	Signs of overloads?	[ ] Yes * [x] No
10.	General condition:	[x] Good [ ] Fair [ ] Poor*

Comments: Lime is introduced to the dewatered sludge on a conveyor that carries the sludge from the press building to a dump truck. The sludge is then hauled to the covered Sludge Holding Pad where stabilization occurs.

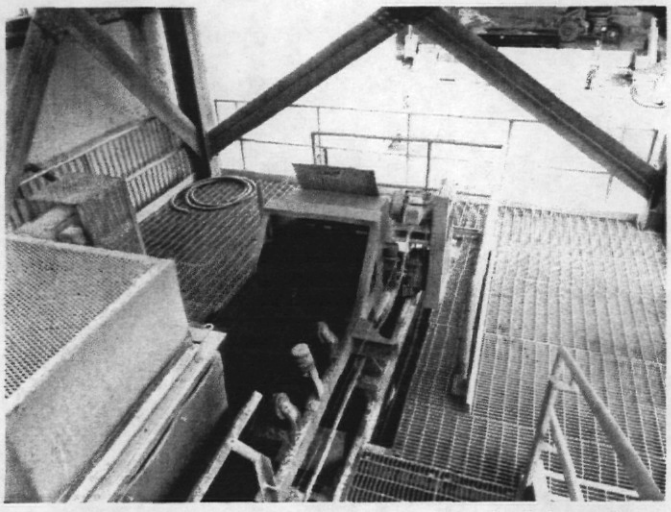


Belt Filter Press

UNIT PROCESS: Lime Stabilization

1.	Number of units:	***2 mixers***
	In operation:	***1***
2.	Type of sludge treated:	[ ] Primary [ ] Was [x] Other: combination
3.	Type of mixing:	[x] Mechanical [ ] Jet pump [ ] Other:
4.	Condition of mixing unit:	[x] Good [ ] Fair [ ] Poor *
5.	Reactor contents well mixed?	[x] Yes [ ] No *
	Relatively free of odors?	[x] Yes [ ] No *
6.	Total volume of reactors:	***N/A Concrete Pad***
7.	Influent flow rate to the reactor:	***N/A 225 Dry tons of cake (w/lime) to the pad in 2/11***
8.	Solids concentration in the influent sludge:	***Dry cake ~avg. w/o lime 22.7% in 2/11***
	Solids concentration in effluent sludge:	***Dry cake ~avg. w/ lime 27.6% in 2/11***
9.	Process control testing:	
	mixture pH:	____
	reactor contact time:	____
	total contact time:	____
	lbs CaCO /lbs dry solids:	***0.4 lb/1lb dry bio-solids***
10.	Condition of lime feeding system:	[x] Good [ ] Fair [ ] Poor*
11.	Condition of sludge pumping system:	[x] Good [ ] Fair [ ] Poor*
12.	Stabilized sludge dewatered?	[x] Yes [ ] No
13.	Final disposal of liquid sludge/cake:	***Land application via contractor (Recyc Systems, Inc)***
14.	General description:	[x] Good [ ] Fair [ ] Poor

Comments: Class B bio-solids is produced.



Bio-solids (with lime added) just ahead of dropping into a dump truck for transport to covered holding pad

Covered bio-solids holding pad

UNIT PROCESS: Sewage Pumping

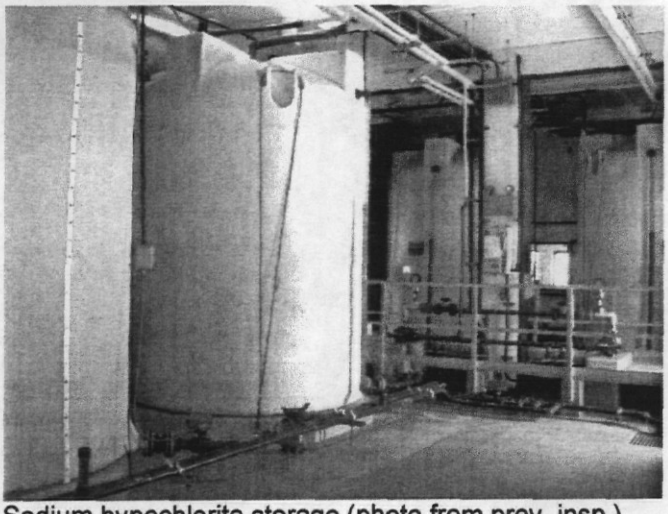
1.	Name of station:	***Filtrate, Leachate and Septage Receiving Pump Station***		
2.	Location (if not at STP):	***Adjacent to the Sludge Holding/Composting Pad***		
3.	Following equipment operable:			
	a. All pumps?	[x] Yes **(2)**	[ ] No*	
	b. Ventilation?	[x] Yes	[ ] No*	[ ] N/A
	c. Control system?	[x] Yes	[ ] No*	[ ] N/A
	d. Sump pump?	[ ] Yes	[ ] No*	[x] N/A
	e. Seal water system?	[ ] Yes	[ ] No*	[x] N/A
4.	Reliability considerations:			
	a. Class	[x] I	[ ] II	[ ] III
	b. Alarm system operable?	[x] Yes	[ ] No	[ ] N/A
	c. Alarm conditions monitored:			
	1. high water level:	[x] Yes	[ ] No*	***Alarm shuts down the solids building***
	2. high liquid level in dry well:	[ ] Yes	[ ] No*	[x] N/A
	3. main electric power:	[ ] Yes	[ ] No*	[x] N/A
	4. auxiliary electric power:	[ ] Yes	[ ] No*	[x] N/A
	5. failure of pump motors to start:	[ ] Yes	[ ] No*	[x] N/A
	6. test function:	[ ] Yes	[x] No*	
	7. other:	***high water level in the septage trough***		
	d. Backup for alarm system operational?	[ ] Yes	[ ] No*	[x] N/A
	e. Alarm signal reported to (identify):	***Local visual & SCADA system***		
	f. Continuous operability provisions:			
	1. Generator hook up?	[x] Yes	[ ] No **(on site generator)**	
	2. Two sources of electricity?	[ ] Yes	[x] No	
	3. Portable pump?	[ ] Yes	[x] No	
	4. 1 day storage?	[ ] Yes	[x] No	
	5. other:	N/A		
5.	Does station have bypass?	[ ] Yes*	[x] No	
	a. Evidence of bypass use?	[ ] Yes*	[ ] No	[x] N/A
	b. Can bypass be disinfected?	[ ] Yes	[ ] No*	[x] N/A
	c. Can bypass be measured?	[ ] Yes	[ ] No*	[x] N/A
6.	How often is station checked?	***3 – 4X/shift and at time of each off load***		
7.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: This pump station receives leachate, septage (from the off-loading station), and filtrate from the gravity belt thickeners, belt filter presses, and sludge holding pad. Runoff from around the solids handling building also drains to this pump station. The wastewater is pumped to the headworks.

UNIT PROCESS: Chlorination (Sodium Hypochlorite)

1.	Number of feed pumps:	***2***
	Number in operation:	***1***
2.	Number of evaporators:	***N/A***
	Number in operation:	***N/A***
3.	Number of chlorine contact tanks:	***6 straight pass tanks***
	Number in operation:	***4***
4.	Proper flow-distribution between units?	[x] Yes [ ] No * [ ] N/A
5.	How is chlorine introduced into the wastewater?	[x] Perforated diffusers [ ] Injector with single entry point [ ] Other
6.	Chlorine residual in basin effluent:	***1.30 mg/l*** **(analysis by SCWWA personnel *0900 hrs. 3/16/11*)**
7.	Applied chlorine dosage:	***4.3 mg/L***
8.	Contact basins adequately baffled?	[x] Yes [ ] No * [ ] N/A
9.	Adequate ventilation in:	
	a. Chemical storage area?	[x] Yes [ ] No * [ ] N/A
	b. Equipment room?	[x] Yes [ ] No * [ ] N/A
10.	Proper safety precautions used?	[x] Yes [ ] No *
11.	General condition:	[x] Good [ ] Fair [ ] Poor*

Comments: The sodium hypochlorite feed rate is flow paced and manually controlled via computer in the control room.



Sodium hypochlorite storage (photo from prev. insp.)

Chlorine contact basins

UNIT PROCESS: Dechlorination

1.	Chemical used:	[ ] Sulfur Dioxide [x] Sodium Bisulfite solution
2.	Number of sulfonators:	N/A
	Number in operation:	N/A
3.	Number of evaporators:	N/A
	Number in operation:	N/A
4.	Number of chemical feeders:	2
	Number in operation:	1
5.	Number of contact tanks:	0 (See item 7 below)
	Number in operation:	0
6.	Proper flow-distribution between units?	[ ] Yes [ ] No * [x] N/A
7.	How is chemical introduced?	[x] Perforated diffusers, just prior to the effluent flume [ ] Injector with single entry point [ ] Other
8.	Control system operational?	[x] Yes [ ] No *
	a. Residual analyzers?	[x] Yes [ ] No * [ ] N/A
	b. System adjusted:	[ ] Automatic [x] Manual [ ] Other:
9.	Applied dechlorinating dose:	***Not ascertained***
10.	Chlorine residual in basin effluent:	***0.01 mg/L (analysis by SCWWA personnel @ 0900 hrs. 3/16/11)***
11.	Contact basins adequately baffled?	[ ] Yes [ ] No * [x] N/A
12.	Adequate ventilation in:	
	a. Chemical storage area?	[x] Yes [ ] No *
	b. Equipment room?	[x] Yes [ ] No *
13.	Proper safety precautions used?	[x] Yes [ ] No *
14.	General condition:	[x] Good [ ] Fair [ ] Poor*

Comments: None

UNIT PROCESS: Flow Measurement

[ ] Influent [ ] Intermediate [x] Effluent

1.	Type measuring device:	***6' Parshall flume with ultrasonic sensor***		
2.	Present reading:	***Instantaneous: 16.122 MGD @ 1125 hrs on 3/16/11***		
3.	Bypass channel?	[ ] Yes	[x] No	
	Metered?	[ ] Yes	[ ] No*	[x] N/A
4.	Return flows discharged upstream from meter?	[ ] Yes	[x] No	
	If Yes, identify:	N/A		
5.	Device operating properly?	[x] Yes	[ ] No*	
6.	Date of last calibration:	***3/15/11***		
7.	Evidence of following problems:			
	a. Obstructions?	[ ] Yes*	[x] No	
	b. Grease?	[ ] Yes*	[x] No	
8.	General condition:	[x] Good	[ ] Fair	[ ] Poor*

Comments: Defoamer is added just below the Parshall flume to reduce foaming at the final outfall.

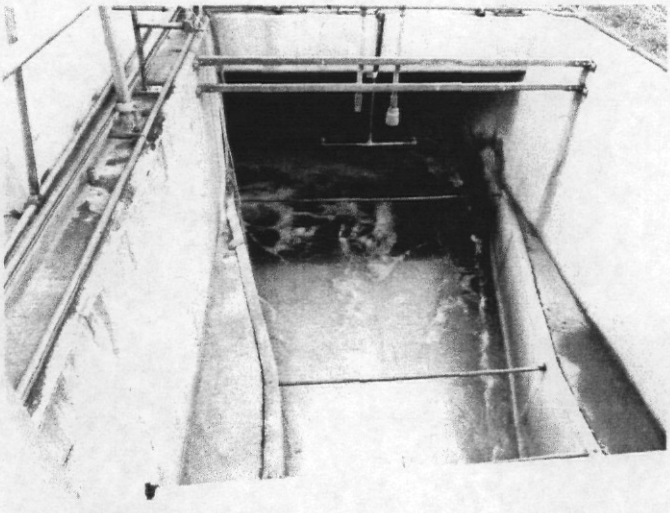
UNIT PROCESS: Effluent/Plant Outfall

1. Type outfall: [x] Shore based [ ] Submerged
2. Type if shore based: [x] Wingwall [ ] Headwall [x] Rip Rap [ ] N/A
3. Flapper valve? [ ] Yes [x] No
4. Erosion of bank? [ ] Yes* [x] No [ ] N/A
5. Effluent plume visible? [X] Yes * [ ] No

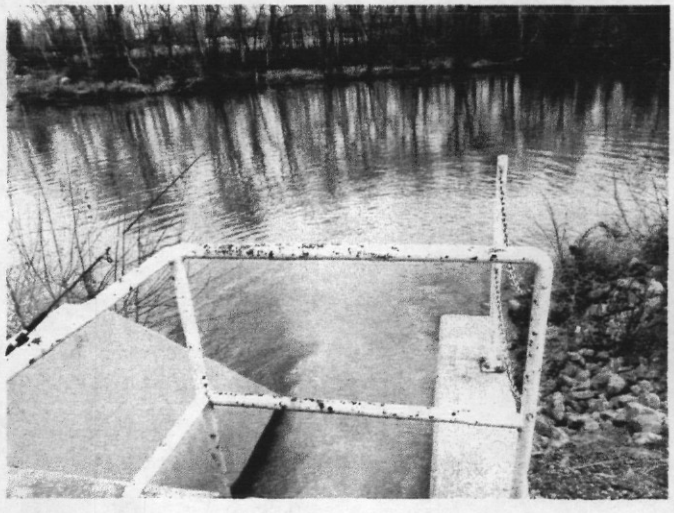
Comments: The effluent created a clear plume in the turbid Appomattox River.

Final effluent analyses by SCWWA personnel: DO 9.6 mg/L, Temp. 14.6 deg C @ 1140 hrs; pH 6.5 SU @ 1147 hrs, Cl2 <QL @ 0900 hrs.

6. Condition of outfall and supporting structures: [x] Good [ ] Fair [ ] Poor *
7. Final effluent, evidence of following problems:
   a. Oil sheen? [ ] Yes* [x] No
   b. Grease? [ ] Yes* [x] No
   c. Sludge bar? [ ] Yes* [x] No
   d. Turbid effluent? [ ] Yes* [x] No
   e. Visible foam? [ ] Yes* [x] No
   f. Unusual odor? [ ] Yes* [x] No



Final effluent at Parshall flume



Final effluent entering the Appomattox River

cc: [x] Owner: Alan Harrison, PE
[ ] Operator:
[ ] Local Health Department:
[ ] VDH Engineering Field Office:
[ ] VDH/Central Office - DWE
[x] DEQ - OWPP, attn: Steven G. Stell
[x] DEQ - Regional Office File
[x] EPA - Region III

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
LABORATORY INSPECTION REPORT

10/01

FACILITY NO:	INSPECTION DATE:	PREVIOUS INSP. DATE:	PREVIOUS EVALUATION:	TIME SPENT:
VA0025437	March 16, 2011	July 21 and 23, 2009	No Deficiencies	4 hours w/ travel & report

NAME/ADDRESS OF FACILITY:	FACILITY CLASS:	FACILITY TYPE:	UNANNOUNCED INSPECTION?	FY-SCHEDULED INSPECTION?
South Central Wastewater Authority 900 Magazine Road Petersburg, VA 23803	(X) MAJOR ( ) MINOR ( ) SMALL ( ) VPA/NDC	(X) MUNICIPAL ( ) INDUSTRIAL ( ) FEDERAL ( ) COMMERCIAL LAB	( ) YES (x) NO	(X) YES ( ) NO

INSPECTOR(S):	REVIEWERS:	PRESENT AT INSPECTION:
M Dare 3-17-11 Mike Dare, Drew Hammond	Chris Stolz 3-17-11 Kw 3/18/11	Christina Stokes, Ray Burpoe, Mike Tavel

LABORATORY EVALUATION	DEFICIENCIES? Yes	No
LABORATORY RECORDS		X
GENERAL SAMPLING & ANALYSIS		X
LABORATORY EQUIPMENT		X
pH ANALYSIS PROCEDURES*		X
DISSOLVED OXYGEN ANALYSIS PROCEDURES*		X
TOTAL RESIDUAL CHLORINE ANALYSIS PROCEDURES*		X
*This inspection covered field equipment only.		

QUALITY ASSURANCE/QUALITY CONTROL

Y/N	QUALITY ASSURANCE METHOD	PARAMETERS	FREQUENCY
	REPLICATE SAMPLES		
	SPIKED SAMPLES		
	STANDARD SAMPLES		
	SPLIT SAMPLES		
	SAMPLE BLANKS		
	OTHER		
	EPA-DMR QA DATA?	RATING: ( ) No Deficiency ( ) Deficiency	
	QC SAMPLES PROVIDED?	RATING: ( ) No Deficiency ( ) Deficiency ( ) NA	

COPIES TO: (X) DEQ - PRO; (X) OWPC; (X) OWNER; (X) EPA Region III; ( ) Other:_____

FACILITY #: VA0025437

LABORATORY RECORDS SECTION

LABORATORY RECORDS INCLUDE THE FOLLOWING:

X	SAMPLING DATE	X	ANALYSIS DATE	N/A*	CONT MONITORING CHART
X	SAMPLING TIME	X	ANALYSIS TIME	X	INSTRUMENT CALIBRATION
X	SAMPLE LOCATION	X	TEST METHOD	X	INSTRUMENT MAINTENANCE
	*Electronic storage			X	CERTIFICATE OF ANALYSIS

WRITTEN INSTRUCTIONS INCLUDE THE FOLLOWING:

X	SAMPLING SCHEDULES	X	CALCULATIONS	X	ANALYSIS PROCEDURES

	YES	NO	N/A
DO ALL ANALYSTS INITIAL THEIR WORK?	X		
DO BENCH SHEETS INCLUDE ALL INFORMATION NECESSARY TO DETERMINE RESULTS?	X		
IS THE DMR COMPLETE AND CORRECT? MONTH(S) REVIEWED: ***1/11 - VA0025437*** ***2010 totals and 1/11 – VAN040087***	X		
ARE ALL MONITORING VALUES REQUIRED BY THE PERMIT REPORTED?	X		

GENERAL SAMPLING AND ANALYSIS SECTION

	YES	NO	N/A
ARE SAMPLE LOCATION(S) ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE SAMPLE COLLECTION PROCEDURES APPROPRIATE?	X		
IS SAMPLE EQUIPMENT CONDITION ADEQUATE?	X		
IS FLOW MEASUREMENT ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE COMPOSITE SAMPLES REPRESENTATIVE OF FLOW?	X		
ARE SAMPLE HOLDING TIMES AND PRESERVATION ADEQUATE?	X		
IF ANALYSIS IS PERFORMED AT ANOTHER LOCATION, ARE SHIPPING PROCEDURES ADEQUATE? LIST PARAMETERS AND NAME & ADDRESS OF LAB: ***Air, Water & Soil Labs, Inc., Richmond, VA:*** *TKN, TN, Nitrate-Nitrite & metals;* ***HRSD, Virginia Beach, VA:*** *Permit renewal testing* ***Coastal Bioanalysts, Inc., Gloucester, VA:*** *wet*	X		

LABORATORY EQUIPMENT SECTION

	YES	NO	N/A
IS LABORATORY EQUIPMENT IN PROPER OPERATING RANGE?	X		
ARE ANNUAL THERMOMETER CALIBRATION(S) ADEQUATE?	X		
IS THE LABORATORY GRADE WATER SUPPLY ADEQUATE?			X
ARE ANALYTICAL BALANCE(S) ADEQUATE?			X

LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME:	FACILITY NO:	INSPECTION DATE:
South Central Wastewater Authority, Inc	VA0025437	March 16, 2011
LABORATORY EVALUATION:	**( ) Deficiencies** **(x) No Deficiencies**	

LABORATORY RECORDS

No deficiencies were noted.

GENERAL SAMPLING AND ANALYSIS

No deficiencies were noted.

LABORATORY EQUIPMENT

No deficiencies were noted.

INDIVIDUAL PARAMETERS

pH Analysis Procedures: **No deficiencies were noted**

Dissolved Oxygen Analysis Procedures: **No deficiencies were noted**

Total Residual Chlorine Analysis Procedures: **No deficiencies were noted**

ANALYST:	**Mike Tavel**	VPDES NO	**VA0025437**

Meter: Orion 3-Star

Parameter: Hydrogen Ion (pH)
1/08

Method: Electrometric

METHOD OF ANALYSIS:

x	18th Edition of Standard Methods – 4500-H^+ B
	21st or Online Editions of Standard Methods – 4500-H^+ B (00)

	pH is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE**: Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.1 SU of the known concentration of the sample. [SM 1020 B.1]	X	
2)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [2.b/c and 5.b]	X	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	X	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] **NOTE**: Follow manufacturer's instructions.	X	
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should be within +/- 0.1 SU. [4.a]	X	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	X	
7)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [3.a]	X	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	X	
9)	For meters with ATC that also have temperature display, is the thermometer verified annually? [SM 2550 B.1]	X	
10)	Is temperature of buffer solutions and samples recorded when determining pH? [4.a]	X	
11)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	X	
12)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [4.a]	X	
13)	Is the sample stirred gently at a constant speed during measurement? [4.b] ***mixing bar***	X	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]	X	
15)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition or daily for 20th or 21st Edition? [Part 1020] **NOTE**: Not required for *in situ* samples.	N/A	
16)	Is the pH of duplicate samples within 0.1SU of the original sample? [Part 1020]	N/A	
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]	N/A	

PROBLEMS: None

ANALYST:	Mike Tavel	VPDES NO	VA0025437

Meter: YSI 58

Parameter: Dissolved Oxygen
Method: Membrane Electrode
Facility Elevation <100'
1/08

METHOD OF ANALYSIS:

x	18th Edition of Standard Methods – 4500-O G
	21st or Online Editions of Standard Methods – 4500-O G (01)

	DO is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [1.c]	**In-situ**	
2)	Are meter and electrode operable and providing consistent readings? [3]	**x**	
3)	Is membrane in good condition without trapped air bubbles? [3.b]	**x**	
4)	Is correct filling solution used in electrode? [Mfr.]	**x**	
5)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	**x**	
6)	Is meter calibrated before use or at least daily? [Mfr. & Part 1020]	**x**	
7)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	**x**	
8)	Is sample stirred during analysis? [Mfr.]	**In-situ**	
9)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	**x**	
10)	Is meter stabilized before reading D.O.? [Mfr.]	**x**	
11)	Is electrode stored according to manufacturer's instructions? [Mfr.]	**x**	
12)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition or daily if citing 20th or 21st Edition? [Part 1020] **NOTE:** Not required for *in situ* samples.	**N/A**	
13)	If a duplicate sample is analyzed, is the reported value for that sampling event the average concentration of the sample and the duplicate? [DEQ]	**N/A**	
14)	If a duplicate sample is analyzed, is the relative percent difference (RPD) ≤ 20? [18th ed. Table 1020 I; 21st ed. DEQ]	**N/A**	

PROBLEMS: None

ANALYST:	Mike Tavel	VPDES NO.	VA0025437

Instrument: HACH Pocket Colorimeter II Parameter: Total Residual Chlorine (TRC)
Method: DPD Colorimetric (HACH Pocket Colorimeter)
1/08

METHOD OF ANALYSIS:

HACH Manufacturer's Instructions (Method 8167) plus an edition of *Standard Methods*

x	18th Edition of *Standard Methods* 4500-Cl G
	21st Edition of *Standard Methods* 4500-Cl G (00)

		Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE:** Analyze 4 samples of known TRC. Must use a lot number or source that is different from that used to prepare calibration standards. May not use Spec√ ™. [SM 1020 B.1]	X	
2)	Are the DPD PermaChem™ Powder Pillows stored in a cool, dry place? [Mfr.]	X	
3)	Are the pillows within the manufacturer's expiration date? [Mfr.]	X	
4)	Has buffering capability of DPD pillows been checked annually? (Pillows should adjust sample pH to between 6 and 7) [Mfr.]	X	
5)	When pH adjustment is required, is H_2SO_4 or NaOH used? [Hach 11.3.1]	X	
6)	Are cells clean and in good condition? [Mfr]	X	
7)	Is the low range (0.01 mg/L resolution) used for samples containing residuals from 0.2.00 mg/L? [Mfr.]	X	
8)	Is calibration curve developed (may use manufacturer's calibration) with daily verification using a high and a low standard? **NOTE:** May use manufacturer's installed calibration and commercially available chlorine standards for daily calibration verifications. [18th ed 1020 B.5; 21st ed 4020 B.2.b]	X	
9)	Is the 10-mL cell (2.5-cm diameter) used for samples from 0-2.00 mg/L? [Mfr.]	X	
10)	Is meter zeroed correctly by using sample as blank for the cell used? [Mfr.]	X	
11)	Is the instrument cap placed correctly on the meter body when the meter is zeroed and when the sample is analyzed? [Mfr.]	X	
12)	Is the DPD Total Chlorine PermaChem™ Powder Pillow mixed into the sample? [Hach 11.1]	X	
13)	Is the analysis made at least three minutes but not more than six minutes after PermaChem™ Powder Pillow addition? [Hach 11.2]	X	
14)	If read-out is flashing [2.20], is sample diluted correctly, and then reanalyzed? [Hach 1.2 & 2.0] ***Low range normally used. If result exceeds 2.2, the high range is used (High range standards are on hand)***	X	
15)	Are samples analyzed within 15 minutes of collection? [40 CFR Part 136]	X	
16)	Is a duplicate sample analyzed after every 20 samples if citing 18th Edition [SM 1020 B.6] or daily for 21st Edition [SM 4020 B.3.c]?	N/A	
17)	If duplicate sample is analyzed, is the relative percent difference (RPD) ≤ 20? [18th ed. Table 1020 I; 21st ed. DEQ]	N/A	

Problems:None

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION

SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET Revised 3/08 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**South Central Wastewater Authority**	VPDES NO	**VA0025437**	DATE:	**March 16, 2011**

HOLDING TIMES						SAMPLE CONTAINER				PRESERVATION				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
BOD5 & CBOD5	48 HOURS									ANALYZE 2 HRS or 6°C				
TSS	7 DAYS									6°C				
FECAL COLIFORM / *E. coli / Enterococci*	6 HRS & 2 HRS TO PROCESS									10°C (1 HOUR)+ 0.008% $Na_2S_2O_3$				
pH	15 MIN.	x		x		x		x		N/A				
CHLORINE	15 MIN.	x		x		x		x		N/A				
DISSOLVED 0_2	15 MIN./IN SITU	x		x		x		x		N/A				
TEMPERATURE	IMMERSION STAB.									N/A				
OIL & GREASE	28 DAYS									6°C + H_2SO_4/HCL pH<2				
AMMONIA	28 DAYS									6°C + H_2S0_4 pH<2 DECHLOR				
TKN	28 DAYS									6°C + H_2S0_4 pH<2 DECHLOR				
NITRATE	48 HOURS									6°C				
NITRATE+NITRITE	28 DAYS									6°C + H_2S0_4 pH<2				
NITRITE	48 HOURS									6°C				
PHOSPHATE, ORTHO	48 HOURS									FILTER, 6°C				
TOTAL PHOS.	28 DAYS									6°C+ H_2S0_4 pH<2				
METALS (except Hg)	6 MONTHS									HNO_3 pH<2				
MERCURY (CVAA)	28 DAYS									HNO_3 pH<2				
PROBLEMS: None										PROBLEMS: None				

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET
1/08

FACILITY NAME:	South Central Wastewater Authority	VPDES NO:	VA0025437	DATE:	March 16, 2011

EQUIPMENT	RANGE	IN RANGE		INSPECT READING °C	CHECK & LOG DAILY		CORRECT INCREMENT		ANNUAL THERMOMETER VERIFICATION				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?				Y
									DATE CHECKED	MARKED		CORR FACTOR	INSPECT TEMP
		Y	N		Y	N	Y	N		Y	N	°C	°C
SAMPLE REFRIGER.	1-6°C												
AUTO SAMPLER	1-6° C	x		#1: 1.5	x		x		6/28/10	x		+ 0.2	
		x		#2: 2.5	x		x		3/8/11	x		0	
BOD INCUBATOR	20 ± 1° C												
SOLIDS DRYING OVEN	103-105° C												
WATER BATH	44.5 ± .2° C												
INCUBATOR	35± .5° C												
AUTOCLAVE	121° C IN 30 MIN												
HOT AIR STERILIZING	170 ± 10° C												
O & G WATER BATH	70± 2° C												
REAGENT REFRIGER.	1-6° C												
pH METER	± 1° C								3/8/11	x		+ 0.2	
DO METER	± 1° C								3/9/11	x		+ 0.1	
THERMOMETER-OUTFALL	± 1° C												
Hg WATER BATH	95 °C												

PROBLEMS: None.

Attachment E

Effluent DMR Data

South Central Wastewater Authority
Permit No. VA0025437
Outfall 001

DMR	Flow		pH		TSS			
Due	Monthly Avg.	Maximum	Minimum	Maximum	Monthly Avg.	Monthly Max.	Weekly Avg.	Weekly Max.
Date	MGD	MGD	s.u.	s.u.	mg/L	kg/d	mg/L	kg/d
6/10/2008	15.25	26.07	6.3	6.8	7	327	7	327
7/10/2008	10.05	10.92	6.4	6.9	1	44	1	44
8/10/2008	9.82	12.55	6.2	6.7	1	37	1	37
9/10/2008	9.67	15.34	6.5	7.2	<QL	<QL	<QL	<QL
10/10/2008	11.98	22.45	6.2	6.9	3	166	3	166
11/10/2008	10.17	13.25	6.3	6.8	<QL	<QL	<QL	<QL
12/10/2008	10.61	17.75	6.3	6.7	<QL	<QL	<QL	<QL
1/10/2009	13.99	26.34	6.2	6.6	1	40	1	40
2/10/2009	11.84	15.40	6.2	6.6	<QL	<QL	<QL	<QL
3/10/2009	10.69	12.34	6.2	6.9	1	40	1	40
4/10/2009	14.88	19.25	6.1	6.5	<QL	<QL	<QL	<QL
5/10/2009	12.75	17.15	6.1	6.6	1	63	1	63
6/10/2009	11.60	16.79	6.3	6.8	1	49	1	49
7/10/2009	10.35	15.16	6.4	6.9	<QL	<QL	<QL	<QL
8/10/2009	9.22	12.09	6.4	6.8	<QL	<QL	<QL	<QL
9/10/2009	9.05	10.08	6.3	6.9	<QL	<QL	<QL	<QL
10/10/2009	9.35	12.29	6.4	7	<QL	<QL	<QL	<QL
11/10/2009	9.27	11.13	6.3	6.8	1	34	1	34
12/10/2009	15.84	45.81	6.2	6.5	1	49	1	49
1/10/2010	20.84	33.36	6.0	6.5	2	146	2	146
2/10/2010	15.25	22.63	6.1	6.5	2	74	2	74
3/10/2010	19.15	36.78	6.0	7	5	424	5	424
4/10/2010	16.32	40.58	6.1	7	1	40	1	40
5/10/2010	13.26	20.47	6.4	6.9	1	49	1	49
6/10/2010	11.36	16.09	6.3	6.8	1	54	1	54
7/10/2010	11.63	18.62	6.5	7.3	1	49	1	49
8/10/2010	9.04	10.28	6.6	7.2	1	49	1	49
9/10/2010	9.52	12.53	6.5	7.2	1	28	1	28
10/10/2010	9.93	31.95	6.5	7.3	<QL	<QL	<QL	<QL
11/10/2010	10.73	18.32	6.6	7.2	<QL	<QL	<QL	<QL
12/10/2010	9.52	12.84	6.3	8.3	2	85	2	85
1/10/2011	10.07	13.44	6.5	7.3	1	92	1	92
2/10/2011	10.25	14.25	6.4	7.2	<QL	<QL	<QL	<QL
3/10/2011	10.13	11.79	6.3	7.1	1	69	1	69
4/10/2011	12.07	20.44	6.2	7	3	112	3	112
5/10/2011	11.48	18.80	6.5	7.2	<QL	<QL	<QL	<QL
			90%	7.3				
			10%	6.6				

South Central Wastewater Authority
Permit No. VA0025437
Outfall 001

DMR	TRC (Final Effluent)		TRC	TRC	DO	TP (as P)		E. coli
Due	Monthly Avg.	Weekly Avg.	Contact Tank	Contact Inst.	Minimum	Monthly Avg.	Monthly Max.	Monthly Avg.
Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	kg/d	CFU/100 mL
6/10/2008	<QL	<QL	1.00	1.00	7.1	1.25	68	Null
7/10/2008	<QL	<QL	0.80	0.80	6.9	1.23	48	Null
8/10/2008	<QL	<QL	0.80	0.80	6.8	1.56	57	Null
9/10/2008	<QL	<QL	0.80	0.80	6.5	1.14	39	Null
10/10/2008	<QL	<QL	0.90	0.90	6.7	1.24	51	Null
11/10/2008	<QL	<QL	0.80	0.80	6.9	0.70	27	Null
12/10/2008	<QL	<QL	0.90	0.90	7.9	0.74	28	Null
1/10/2009	<QL	<QL	0.80	0.80	8.1	0.92	44	Null
2/10/2009	<QL	<QL	1.00	1.00	7.7	0.89	41	Null
3/10/2009	<QL	<QL	0.80	0.80	8.4	1.24	50	Null
4/10/2009	<QL	<QL	1.00	1.00	7.9	0.87	48	Null
5/10/2009	<QL	<QL	0.80	0.80	7.3	1.01	54	Null
6/10/2009	<QL	<QL	0.80	0.80	7.4	1.34	60	Null
7/10/2009	<QL	<QL	0.80	0.80	6.7	0.80	31	Null
8/10/2009	<QL	<QL	0.80	0.80	6.9	1.60	55	Null
9/10/2009	<QL	<QL	0.80	0.80	6.8	1.56	53	Null
10/10/2009	<QL	<QL	0.80	0.80	6.8	1.16	42	Null
11/10/2009	<QL	<QL	0.9	0.90	7.0	1.38	49	Null
12/10/2009	<QL	<QL	0.8	0.80	7.8	1.14	58	Null
1/10/2010	<QL	<QL	0.90	0.90	7.7	1.17	88	Null
2/10/2010	<QL	<QL	0.90	0.90	9.0	1.40	81	Null
3/10/2010	<QL	<QL	0.80	0.80	8.4	0.97	65	Null
4/10/2010	<QL	<QL	0.80	0.80	8.8	1.21	76	Null
5/10/2010	<QL	<QL	0.70	0.70	8.1	1.33	62	Null
6/10/2010	<QL	<QL	0.8	0.80	7.9	1.58	69	1
7/10/2010	<QL	<QL	0.80	0.80	7.0	1.06	47	1
8/10/2010	<QL	<QL	0.80	0.80	7.0	1.17	42	2
9/10/2010	<QL	<QL	0.70	0.70	7.0	1.25	44	1
10/10/2010	<QL	<QL	0.80	0.80	6.7	1.01	44	1
11/10/2010	<QL	<QL	0.90	0.90	7.0	1.44	57	1
12/10/2010	<QL	<QL	0.80	0.80	7.1	1.62	57	1
1/10/2011	<QL	<QL	0.90	0.90	7.8	1.07	42	2
2/10/2011	<QL	<QL	1.00	1.00	8.2	1.32	54	2
3/10/2011	<QL	<QL	1.0	1.00	8.7	1.43	51	1
4/10/2011	<QL	<QL	0.80	0.80	8.9	1.44	63	1
5/10/2011	<QL	<QL	0.90	0.90	8.4	1.23	52	2

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DMR	Ammonia (as N)				cBOD5			
Due	Monthly Avg.	Monthly Max.	Weekly Avg.	Weekly Max.	Monthly Avg.	Monthly Max.	Weekly Avg.	Weekly Max.
Date	mg/L	kg/d	mg/L	kg/d	mg/L	kg/d	mg/L	kg/d
6/10/2008	0.05	3	0.21	11	<QL	<QL	<QL	<QL
7/10/2008	0.04	2	0.09	3	<QL	<QL	<QL	<QL
8/10/2008	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
9/10/2008	0.03	2	0.11	7	<QL	<QL	<QL	<QL
10/10/2008	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
11/10/2008	0.03	1	0.14	5	<QL	<QL	<QL	<QL
12/10/2008	0.06	3	0.26	11	<QL	<QL	<QL	<QL
1/10/2009	0.12	10	0.42	42	<QL	<QL	<QL	<QL
2/10/2009	0.07	3	0.22	10	<QL	<QL	<QL	<QL
3/10/2009	0.23	9	0.72	29	<QL	<QL	<QL	<QL
4/10/2009	0.07	4	0.34	17	<QL	<QL	<QL	<QL
5/10/2009	0.16	7	0.28	15	0	18	<QL	<QL
6/10/2009	<QL	<QL	<QL	<QL	1	48	3	194
7/10/2009	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
8/10/2009	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
9/10/2009	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
10/10/2009	0.03	1	0.08	3	<QL	<QL	<QL	<QL
11/10/2009	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
12/10/2009	0.07	5	0.30	20	1	133	3	532
1/10/2010	0.06	5	0.23	15	2	156	3	201
2/10/2010	0.05	3	0.10	6	0	27	2	108
3/10/2010	0.56	35	1.38	80	<QL	<QL	<QL	<QL
4/10/2010	0.07	4	0.31	17	<QL	<QL	<QL	<QL
5/10/2010	0.18	10	0.49	28	<QL	<QL	<QL	<QL
6/10/2010	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
7/10/2010	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
8/10/2010	0.02	1	0.07	2	<QL	<QL	<QL	<QL
9/10/2010	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
10/10/2010	0.06	8	<QL	<QL	<QL	<QL	<QL	<QL
11/10/2010	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
12/10/2010	0.07	2	0.31	11	<QL	<QL	<QL	<QL
1/10/2011	0.03	1	0.07	4	<QL	<QL	<QL	<QL
2/10/2011	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL
3/10/2011	0.02	1	0.07	3	<QL	<QL	<QL	<QL
4/10/2011	.02	1	<QL	<QL	<QL	<QL	<QL	<QL
5/10/2011	0.05	2	0.14	6	<QL	<QL	<QL	<QL

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DMR	% Solids		Total Arsenic		Total Cadmium		Total Copper	
Due	Monthly Avg.	Maximum	Monthly Avg.	Maximum	Monthly Avg.	Maximum	Monthly Avg.	Maximum
Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
7/10/2008	29.60	Null	<1.690	<1.690	<1.690	<1.690	266	266
9/10/2008	27.50	Null	2.06	2.06	<1.820	<1.820	316	316
11/10/2008	31.4	Null	1.88	1.88	1.59	1.59	212	212
1/10/2009	26.00	Null	1.92	1.92	1.92	1.92	262	262
3/10/2009	28.9	Null	<1.7	<1.7	<1.7	<1.7	225	225
5/10/2009	25.9	Null	1.93	1.93	1.93	1.93	204	204
7/10/2009	34.3	Null	1.46	1.46	1.88	1.88	359	359
9/10/2009	31.0	Null	1.62	1.62	1.62	1.62	208	208
11/10/2009	31.3	Null	1.6	1.6	1.60	1.60	223	223
1/10/2010	41.60	Null	<1.2	<1.2	<1.2	<1.2	144	144
3/10/2010	39.4	Null	1.75	1.75	1.27	1.27	123	123
5/10/2010	37.1	Null	<1.35	<1.35	<1.35	<1.35	152	152
7/10/2010	36.6	Null	1.37	1.37	1.37	1.37	179	179
9/10/2010	33.1	Null	1.51	1.51	1.51	1.51	98	98
11/10/2010	31.3	Null	1.6	1.6	1.60	1.60	198	198
1/10/2011	29.9	Null	1.93	1.93	2.00	2.00	254	254
3/10/2011	26.3	Null	<1.90	<1.90	<1.90	<1.90	138	138
5/10/2011	29.3	Null	1.61	1.61	1.61	1.61	148	148

DMR	Total Lead		Total Mercury		Total Molybdenum		Total Nickel	
Due	Monthly Avg.	Maximum	Monthly Avg.	Maximum	Monthly Avg.	Maximum	Monthly Avg.	Maximum
Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
7/10/2008	26	26	0.169	0.169	Null	<8.440	9.75	9.75
9/10/2008	28.2	28.2	0.46	0.46	Null	9.43	12.8	12.8
11/10/2008	33	33	0.44	0.44	Null	8.20	15.9	15.9
1/10/2009	13.4	13.4	0.256	0.256	Null	9.62	8.55	8.55
3/10/2009	12.4	12.4	0.40	0.40	Null	4.20	7	7
5/10/2009	17.1	17.1	0.31	0.31	Null	9.65	13.9	13.9
7/10/2009	28.6	28.6	0.414	0.414	Null	7.28	13.9	13.9
9/10/2009	14.6	14.6	0.280	0.280	Null	8.08	7.2	7.2
11/10/2009	13.1	13.1	0.0098	0.0098	Null	5.14	7.6	7.6
1/10/2010	12.1	12.1	1.26	1.26	Null	4.44	6.13	6.13
3/10/2010	12.2	12.2	0.279	0.279	Null	2.33	5.04	5.04
5/10/2010	15.5	15.5	0.296	0.296	Null	<6.74	5.77	5.77
7/10/2010	14	14	0.27	0.27	Null	3.47	5.86	5.86
9/10/2010	8.3	8.3	0.34	0.34	Null	1.75	3.8	3.8
11/10/2010	14.9	14.9	0.42	0.42	Null	4.67	7.11	7.11
1/10/2011	57.6	57.6	1.13	1.13	Null	7.91	19.9	19.9
3/10/2011	9.3	9.3	0.34	0.34	Null	3.09	8.4	8.4
5/10/2011	11.4	11.4	0.30	0.30	Null	3.52	8.35	8.35

DMR	Total Selenium		Total Zinc	
Due	Monthly Avg.	Maximum	Monthly Avg.	Maximum
Date	mg/kg	mg/kg	mg/kg	mg/kg
7/10/2008	<8.440	<8.440	330	330
9/10/2008	<9.090	<9.090	416	416
11/10/2008	7.96	7.96	376	376
1/10/2009	9.62	9.62	316	316
3/10/2009	<8.6	<8.6	230	230
5/10/2009	96.5	96.5	315	315
7/10/2009	7.28	7.28	417	417
9/10/2009	8.08	8.08	311	311
11/10/2009	7.99	7.99	312	312
1/10/2010	<6.010	<6.010	230	230
3/10/2010	6.34	6.34	193	193
5/10/2010	<6.74	<6.74	214	214
7/10/2010	6.84	6.84	260	260
9/10/2010	7.56	7.56	150	150
11/10/2010	7.99	7.99	333	333
1/10/2011	8.35	8.35	523	523
3/10/2011	<9.52	<9.52	221	221
5/10/2011	8.04	8.04	216	216

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DMR Due Date	Annual Production kg	Annual Land Applied kg	Annual Incinerated kg	Annual Landfill kg	Annual Other Method kg
1/10/2007	Null	Null	Null	Null	Null
1/10/2008	Null	Null	Null	Null	Null
1/10/2009	Null	Null	Null	Null	Null
1/10/2010	4192	4192	Null	Null	Null
1/10/2011	3346	3346	0	0	0

Attachment F

Water Quality Criteria Monitoring Summary

WATER QUALITY CRITERIA MONITORING SUMMARY [4]

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [1]	REPORTED RESULTS (µg/L)
METALS		
Antimony, dissolved	1700	<60, <100, <100
Arsenic, dissolved	230	<60, <60, <60
Barium, dissolved	-----	<10, 15
Cadmium, dissolved	0.82	<0.50, <0.50, <0.50
Chromium III, dissolved [3]	52	<10
Chromium VI, dissolved [3]	12	<10
Copper, dissolved	4.4	6, 3, 7, 4.1, 4.6, 5.8, 4.2, 4.4, 6.5, 5.9
Iron, dissolved	-----	<100, <100
Lead, dissolved	6.1	<2.0, <2.0, <2.0
Manganese, dissolved	-----	29, 17.7
Mercury, dissolved	1.1	<2.0 ng/L 3.8 ng/L <3.0 ng/L
Nickel, dissolved	14	<10, <10, <10
Selenium, Total Recoverable	7.8	<2.0, <2.0
Selenium, dissolved	-----	<2.0, <2.0, <2.0
Silver, dissolved	0.56	<0.50, <0.50, <0.50
Thallium, dissolved	(2)	<40, <40, <40
Zinc, dissolved	42	38, 33, 39
PESTICIDES / PCB'S		
Aldrin	0.05	<0.05
Chlordane	0.2	Non-detect @ 0.20
Chlorpyrifos (synonym = Dursban)	(2)	<0.10
DDD	0.1	<0.05
DDE	0.1	<0.05

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [1]	REPORTED RESULTS (µg/L)
DDT	0.1	<0.05
Demeton	(2)	<0.10
Diazinon	(2)	<0.10
Dieldrin	0.1	<0.05
Alpha-Endosulfan	0.1	<0.05
Beta-Endosulfan	0.1	<0.05
Endosulfan Sulfate	0.1	<0.05
Endrin	0.1	<0.05
Endrin Aldehyde	(2)	<0.05
Guthion	(2)	<0.10
Heptachlor	0.05	<0.05
Heptachlor Epoxide	(2)	<0.05
Hexachlorocyclohexane Alpha-BHC	(2)	<0.05
Hexachlorocyclohexane Beta-BHC	(2)	<0.05
Hexachlorocyclohexane Gamma-BHC or Lindane	(2)	<0.05
Kepone	(2)	<0.80
Malathion	(2)	<0.10
Methoxychlor	(2)	<0.05
Mirex	(2)	<0.05
Parathion	(2)	<0.10
PCB Total	7.0	Non-detect @ 7.00
Toxaphene	5.0	Non-detect @ 5.00
BASE NEUTRAL EXTRACTABLES		
Acenaphthene	10.0	<10.0, <10.0, <10.0
Anthracene	10.0	<10.0, <10.0, <10.0
Benzidine	(2)	<10.0, <10.0, <10.0
Benzo (a) anthracene	10.0	<10.0, <10.0, <10.0

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [1]	REPORTED RESULTS (µg/L)
Benzo (b) fluoranthene	10.0	<10.0, <10.0, <10.0
Benzo (k) fluoranthene	10.0	<10.0, <10.0, <10.0
Benzo (a) pyrene	10.0	<10.0, <10.0, <10.0
Bis 2-Chloroethyl Ether	(2)	<10.0, <10.0, <10.0
Bis 2-Chloroisopropyl Ether	(2)	<10.0, <10.0 <10.0
Butyl benzyl phthalate	10.0	<10.0, <10.0, <10.0
2-Chloronaphthalene	(2)	<10.0, <10.0, <10.0
Chrysene	10.0	<10.0, <10.0 <10.0
Dibenz(a,h)anthracene	20.0	<10.0, <10.0, <10.0,
Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	10.0	<10.0, <10.0, <10.0
1,2-Dichlorobenzene	10.0	<10.0, <10.0, <10.0
1,3-Dichlorobenzene	10.0	<10.0, <10.0, <10.0
1,4-Dichlorobenzene	10.0	<10.0, <10.0, <10.0
3,3-Dichlorobenzidine	(2)	<10.0, <10.0 <10.0
Diethyl phthalate	10.0	<10.0, <10.0, <10.0
Bis-2-ethylhexyl phthalate	10.0	<10.0, <10.0, <10.0
Dimethyl phthalate	(2)	<10.0, <10.0, <10.0
2,4-Dinitrotoluene	10.0	<10.0, <10.0, <10.0
1,2-Diphenylhydrazine	(2)	<10.0, <10.0, <10.0
Fluoranthene	10.0	<10.0, <10.0, <10.0
Fluorene	10.0	<10.0, <10.0, <10.0
Hexachlorobenzene	(2)	<10.0, <10.0, <10.0
Hexachlorobutadiene	(2)	<10.0, <10.0, <10.0
Hexachlorocyclopentadiene	(2)	<10.0, <10.0, <10.0
Hexachloroethane	(2)	<10.0, <10.0, <10.0
Indeno(1,2,3-cd)pyrene	20.0	<10.0, <10.0, <10.0
Isophorone	10.0	<10.0, <10.0, <10.0

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [1]	REPORTED RESULTS (µg/L)
Nitrobenzene	10.0	<10.0, <10.0, <10.0
N-Nitrosodimethylamine	(2)	<10.0, <10.0, <10.0
N-Nitrosodi-n-propylamine	(2)	<10.0, <10.0, <10.0
N-Nitrosodiphenylamine	(2)	<10.0, <10.0, <10.0
Pyrene	10.0	<10.0, <10.0, <10.0
1,2,4-Trichlorobenzene	10.0	<10.0, <10.0, <10.0
VOLATILES		
Acrolein	(2)	<10.0, <50.0, <20.0
Acrylonitrile	(2)	<10.0, <10.0, <10.0
Benzene	10.0	<10.0, <10.0 <10.0
Bromoform	10.0	<10.0, 83.9, 31.2
Carbon Tetrachloride	10.0	<10.0, <10.0, <10.0
Chlorobenzene (synonym = monochlorobenzene)	50.0	<10.0
Chlorodibromomethane	10.0	<10.0, 17.8, 14.1
Chloroform	10.0	16.8, <10.0, <10.0
Dichloromethane (synonym = methylene chloride)	20.0	<10.0
Dichlorobromomethane	10.0	<10.0, <10.0 <10.0
1,2-Dichloroethane	10.0	<10.0, <10.0, <10.0
1,1-Dichloroethylene	10.0	<10.0, <10.0, <10.0
1,2-trans-dichloroethylene	(2)	<10.0, <10.0, <10.0
1,2-Dichloropropane	(2)	<10.0, <10.0, <10.0
1,3-Dichloropropene	(2)	<20.0, <20.0, <20.0
Ethylbenzene	10.0	<10.0, <10.0, <10.0
Methyl Bromide	(2)	<10.0, <10.0 <10.0
1,1,2,2-Tetrachloroethane	(2)	<10.0, <10.0, <10.0
Tetrachloroethylene	10.0	<10.0, <10.0, <10.0
Toluene	10.0	<10.0, <10.0, <10.0

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [1]	REPORTED RESULTS (µg/L)
1,1,2-Trichloroethane	(2)	<10.0, <10.0 <10.0
Trichloroethylene	10.0	<10.0, <10.0, <10.0
Vinyl Chloride	10.0	<10.0, <10.0, <10.0
RADIONUCLIDES		
Beta Particle & Photon Activity (mrem/yr)	(2)	9.44 pCi/L 5.93 pCi/L
Gross Alpha Particle Activity (pCi/L)	(2)	Non-detect
ACID EXTRACTABLES		
2-Chlorophenol	10.0	<10.0, <10.0, <10.0
2,4 Dichlorophenol	10.0	<10.0, <10.0, <10.0
2,4 Dimethylphenol	10.0	<10.0, <10.0, <10.0
2,4-Dinitrophenol	(2)	<20.0, <10.0, <10.0
2-Methyl-4,6-Dinitrophenol	(2)	<20.0, <10.0, <10.0
Nonylphenol	(2)	<10.0
Pentachlorophenol	50.0	<10.0, <10.0, <10.0
Phenol	10.0	<10.0, <10.0, <10.0
2,4,6-Trichlorophenol	10.0	<10.0, <10.0, <10.0
MISCELLANEOUS		
Ammonia as NH3-N	200	<200, <200, <200
Chlorides	(2)	60 mg/L 83 mg/L 70.4 mg/L
Chlorine, Total Residual	100	<100
Cyanide, Free	10.0	<10.0
E. coli (N/CML)	(2)	1
Foaming Agents (as MBAS)	(2)	<0.03 mg/L
Hydrogen Sulfide	(2)	<0.3 mg/L
Nitrate as N (mg/L)	(2)	14.0, 8.77
Sulfate (mg/L)	(2)	37.2

CHEMICAL	REQUIRED QUANTIFICATION LEVEL [(1)]	REPORTED RESULTS (µg/L)
Total Dissolved Solids (mg/L)	(2)	343
Tributyltin [(7)]	(2)	Non-detect @ 30 ng/L
Hardness (mg/L as $CaCO_3$)	(2)	56.9, 53.5, 52.6 44.5

FOOTNOTES:

(1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

(2) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.

(3) Both Chromium III and Chromium VI may be measured by the total chromium analysis. If the result of the total chromium analysis is less than or equal to the lesser of the Chromium III or Chromium VI method QL, the results for both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(4) The permittee performed various Water Quality Criteria monitoring on 3/19/2008, 9/10/2009, 9/29/2009, 4/14/2010, 3/16/2011, 3/20/2011, and 11/23/2011. This monitoring was submitted with the permit reissuance application, in conjunction with EPA Form 2A, and the results have been summarized herein.

Attachment G

Stream Sanitation Analysis Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Water Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296 804/527-5020

SUBJECT: South Central Wastewater Authority Treatment Plant
Review of Report
River and Effluent Data Evaluation for Effluent Limits, Amendment to Evaluate Tidal Influence on Acute and Chronic Dilution Characteristics, Hazen and Sawyer, August 1999.

TO: Diane Cook

FROM: Jon van Soestbergen

DATE: August 31, 1999

COPIES: Curt Linderman, J.R. Bell

I have reviewed the subject report, and offer the following comments. In the interest of expediting the processing of the subject permit, I offer recommendations related to dilution ratios for use in determining wasteload allocations.

Acute Characteristics

On Page 3, the report indicates that the minimum 1-hour velocities were used in the CORMIX simulations with the low tide river cross-section, which is provided in a Table on Page 2. The CORMIX runs included with the report, however, do not reflect this statement. Specifically, the CORMIX results for Run I indicate a cross-sectional area of 126 m^2 (1,356 ft^2), whereas the table on Page 2 provides a cross sectional area of 1,073 ft^2. This results in increasing the ambient flow used in the model, thereby increasing dilution. Run I was used for evaluation of critical acute dilution values. The report indicates (Page 4) that the effluent is fully mixed in the passive ambient process with a value of 3.1 to 1.

Using CORMIX 3, I recreated the Run I analysis included in the subject report, but adjusted the average ambient channel depth from 2.1 to 1.66 meters to reflect the low tide river cross-sectional area provided in the Table on Page 2 of the report. I also adjusted the ambient channel depth near the outfall from 1.7 to 1.6 meters. No other values were changed. A copy of the adjusted CORMIX analysis is attached.

The results of this adjusted CORMIX analysis indicate that the hydrodynamic centerline dilution S at the boundary of the allocated impact zone (near-field region) is 1.9. This number reflects the ratio of the initial concentration of a conservative substance in the effluent to the concentration of that effluent at the edge of the near-field mixing zone. The mixing zone extends 136 meters downstream of the discharge, and 36 meters perpendicular from the shore into the Appomattox River.

Recommendation

The results of Run II in the report should not be used for determining wasteload allocations relative to acute criteria. Use of the following equation is recommended:

$WLA_a = Std_a \times 1.9$ where WLA_a = acute Wasteload Allocation
Std_a = acute Water Quality Standard

Chronic Standard

As for the Acute Standard analysis, the cross-sectional area used for the CORMIX analysis for chronic conditions (Run IV) does not agree with the value presented in the Table on Page 2 (1,641 ft^2 vs 1,330 ft^2).

The results of Run IV indicate that the discharge plume becomes fully mixed at 13,621 meters (8.46 miles) downstream. Given a width of approximately 200 feet, this is almost 45 times the maximum extent of a mixing zone allowed under the mixing zone criteria provided in 9 VAC 25-260-20, B.1.e. ("No mixing zone ... shall extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.")

The subject report uses the analyses performed to produce an equation relating instream concentration as a function of range, based on an initial effluent concentration of 100 ppm. This equation is provided in Figure 3 of the subject report as follows:

$y = -7.148\text{Ln}(x) + 79.167$

where y is the instream concentration in ppm relative to a base concentration of 100 ppm, and
x is the distance downstream from the discharge in meters

Using this equation, the in-stream concentration at the distance specified by the mixing zone criteria (five times the width) can be calculated as follows:

$x = 200 \text{ ft} \times 0.3048 \text{ ft/m} \times 5$
$= 304.8 \text{ m}$

$y = -7.148\text{Ln}(304.8) + 79.167$
$= 38.28 \text{ ppm}$

Using the base concentration of 100 ppm, the dilution ratio at this location can thus be calculated as 100/38.28 = 2.6.

Recommendation

The results of Run I in the report should not be used for determining wasteload allocations relative to chronic criteria. Use of the following equation is recommended:

$WLA_c = Std_c \times 2.6$ where WLA_c = chronic Wasteload Allocation
Std_c = chronic Water Quality Standard

If you have any questions or need additional information, please do not hesitate to contact me.

```
CORMIX3 PREDICTION FILE:
3333333333333333333333333333333333333333333333333333333333333333333333333333
                    CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX3:                                              Subsystem version:
 Buoyant Surface Discharges                          CORMIX v.3.20     September 1996
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          South^Central^Regional^WWTF
 Design case:              Run^I^with^adjusted^depth
 FILE NAME:                cormix\sim\deqrun1 .cx3
 Time of Fortran run:      08/31/99--07:29:59

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =     60.00  AS     =     99.60  QA     =      3.49  ICHREG= 1
 HA     =      1.66  HD     =      1.60
 UA     =      .035  F      =      .039  USTAR  = .2444E-02
 UW     =      .000  UWSTAR= .0000E+00
 Uniform density environment
 STRCND=  U          RHOAM =  998.0000

DISCHARGE PARAMETERS (metric units)
 BANK   =  RIGHT     DISTB =      .00  Configuration: flush discharge
 SIGMA  =    90.00   HD0   =      .89  SLOPE =     15.00
 Rectangular channel geometry:
 B0     =      .810  H0    =      .810  A0     = .6561E+00  AR     =     1.000
 U0     =    1.536  Q0     =    1.008          = .1008E+01
 RHO0   =  998.0000  DRHO0 = .0000E+00  GP0    = .0000E+00
 C0     = .1000E+03  CUNITS=  ppm
 IPOLL  =  1         KS    = .0000E+00  KD     = .0000E+00

FLUX VARIABLES (metric units)
 Q0     = .1008E+01  M0     = .1548E+01  J0     = .0000E+00
 Associated length scales (meters)
 LQ     =      .81   LM     =  99999.00  Lm     =     35.55  Lb     =      .00
 LQ2D   =      .40   LM2D   =  99999.00  Lm2D   =    761.22

NON-DIMENSIONAL PARAMETERS
 FR0    =  99999.00  FRCH   =  99999.00  R      =     43.88

FLOW CLASSIFICATION
 333333333333333333333333333333333333333
 3  Flow class (CORMIX3)       =    SA2    3
 3  Applicable layer depth HS  =     1.60  3
 333333333333333333333333333333333333333

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0     = .1000E+03  CUNITS=  ppm
 NTOX   =  0
 NSTD   =  0
 REGMZ  =  0
 XINT   =   3000.00  XMAX   =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the WATER SURFACE and at center of discharge
      channel/outlet:        .00 m  from the RIGHT bank/shore.
    X-axis points downstream
    Y-axis points to left as seen by an observer looking downstream
    Z-axis points vertically upward (in CORMIX3, all values Z = 0.00)
```

NSTEP = 6 display intervals per module

	TRJBUO	TRJATT	TRJBND	TRJNBY	TRJCOR	DILCOR
C	1.000	.500	.026	.100	.100	.500

BEGIN MOD301: DISCHARGE MODULE

Efflux conditions:

X	Y	Z	S	C	BV	BH
.00	.00	0.00	1.0	.100E+03	.81	.41

END OF MOD301: DISCHARGE MODULE

BEGIN MOD302: ZONE OF FLOW ESTABLISHMENT

Control volume inflow:

X	Y	Z	S	C	BV	BH
.00	.00	0.00	1.0	.100E+03	.81	.41

Profile definitions:
BV = Gaussian 1/e (37%) vertical thickness
BH = Gaussian 1/e (37%) horizontal half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Control volume outflow:

X	Y	Z	S	C	BV	BH
.02	3.18	0.00	1.1	.936E+02	1.00	.64

Cumulative travel time = 2. sec

END OF MOD302: ZONE OF FLOW ESTABLISHMENT

BEGIN MOD317: WEAKLY DEFLECTED JET (3-D) WITH LEESIDE RECIRCULATION ZONE

Surface JET into a crossflow

This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD317: WEAKLY DEFLECTED JET (3-D) WITH LEESIDE RECIRCULATION ZONE

BEGIN MOD318: WEAKLY DEFLECTED JET (2-D) WITH LEESIDE RECIRCULATION ZONE

Surface JET into a crossflow

Profile definitions:
BV = water depth (vertically mixed)
BH = Gaussian 1/e (37%) horizontal half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.02	3.18	0.00	1.1	.936E+02	1.60	.64
1.06	4.80	0.00	1.2	.864E+02	1.60	.87
2.19	6.42	0.00	1.2	.806E+02	1.60	1.11
3.39	8.04	0.00	1.3	.759E+02	1.60	1.35
4.66	9.66	0.00	1.4	.719E+02	1.60	1.60
5.99	11.28	0.00	1.5	.685E+02	1.60	1.85

```
      7.39     12.89     0.00      1.5   .655E+02    1.60      2.11
 Cumulative travel time =          70. sec

  Some concentration build-up near bank/shore due to recirculation effects.
    Find concentration and thickness values for the RECIRCULATION REGION
    at end of MOD329!

END OF MOD318: WEAKLY DEFLECTED JET (2-D) WITH LEESIDE RECIRCULATION ZONE
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD328: STRONGLY DEFLECTED JET (2-D) WITH LEESIDE RECIRCULATION ZONE

 Profile definitions:
   BV = water depth (vertically mixed)
   BH = Gaussian 1/e (37%) horizontal half-width, measured normally from shore
   S = hydrodynamic centerline dilution
   C = centerline concentration (includes reaction effects, if any)

      X         Y         Z         S         C         BV        BH
    7.39     12.89      0.00      1.5   .655E+02    1.60      7.68
   28.90     19.43      0.00      1.6   .610E+02    1.60      9.31
   50.40     23.96      0.00      1.7   .582E+02    1.60     10.44
   71.90     27.66      0.00      1.8   .561E+02    1.60     11.37
   93.41     30.85      0.00      1.8   .544E+02    1.60     12.16
  114.91     33.71      0.00      1.9   .530E+02    1.60     12.88
  136.41     36.32      0.00      1.9   .518E+02    1.60     13.53
 Cumulative travel time =         3756. sec

  The near-shore RECIRCULATION REGION extends back to the discharge location:
    Concentration C within that region:          .414E+02
    Layer thickness BV within that region:     1.60

END OF MOD328: STRONGLY DEFLECTED JET (2-D) WITH LEESIDE RECIRCULATION ZONE
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD341: BUOYANT AMBIENT SPREADING

 Plume is ATTACHED to RIGHT bank/shore.
   Plume width is now determined from RIGHT bank/shore.

 Plume condition is non-buoyant or weakly buoyant,
   or it is governed by full vertical mixing at the end of the NFR.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD341: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD361: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

 Vertical diffusivity (initial value)    =  .812E-03 m^2/s
 Horizontal diffusivity (initial value)  =  .101E-02 m^2/s

Profile definitions:
  BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
     = or equal to water depth, if fully mixed
  BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
       measured horizontally in Y-direction
```

S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH
136.41	.00	0.00	1.9	.518E+02	1.66	25.99

Plume interacts with BOTTOM.
The passive diffusion plume becomes VERTICALLY FULLY MIXED within this prediction interval.

613.68	.00	0.00	2.0	.505E+02	1.66	26.63
1090.94	.00	0.00	2.0	.494E+02	1.66	27.26
1568.21	.00	0.00	2.1	.483E+02	1.66	27.87
2045.47	.00	0.00	2.1	.473E+02	1.66	28.47
2522.73	.00	0.00	2.2	.463E+02	1.66	29.06
3000.00	.00	0.00	2.2	.454E+02	1.66	29.63

Cumulative travel time = 66610. sec

Simulation limit based on maximum specified distance = 3000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD361: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX3: Buoyant Surface Discharges End of Prediction File

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Attachment H

MSTRANTI & STATS Analyses

MSTRANTI DATA SOURCE REPORT

VA0025437 – South Central Wastewater Authority

Stream Information	
Mean Hardness	Flow Frequency Memo
90% Temperature (annual)	
90% Temperature (wet season)	Flow Frequency Memo In-Stream Temperature Analysis (1)
90% Maximum pH	Flow Frequency Memo
10% Maximum pH	
Tier Designation	
Stream Flows	
All Data	Stream Sanitation Analysis Memo (2)
Mixing Information	
All Data	Assumed to be 100% for discharges to tidal freshwaters
Effluent Information	
Mean Hardness	Calculated from data provided with the permit application (Attachment F)
90% Temperature (annual)	Calculated from data provided with the permit application (3)
90% Temperature (wet season)	
90% Maximum pH	Calculated from data provided on monthly discharge monitoring reports
10% Maximum pH	
Discharge Flow	Stream Sanitation Analysis Memo (2)

(1) In-stream temperature data (provided with the flow frequency analysis memo) collected between November 1st and May 31st was utilized to calculate a wet season (winter) 90th percentile temperature.

(2) The stream sanitation analysis memo establishes an acute tidal dilution ratio of 1.9:1 (1.9 parts total flow to 1 part effluent flow) and a chronic tidal dilution ratio of 2.6:1. Therefore, the discharge flow was set equal to 1 MGD, stream flows associated with acute criteria (1Q10) were set equal to 0.9 MGD, and stream flows associated with chronic and human health criteria (7Q10, 30Q10, 30Q5, Harmonic Mean) were set equal to 1.6 MGD.

(3) The permittee provided 360 effluent temperature data points in conjunction with EPA Form 2A. This data was utilized to calculate an annual and wet season (winter) 90th percentile effluent temperature. See below.

Date	Effluent Temp. °C
3/1/2010	12.4
3/2/2010	12.8
3/3/2010	12.3
3/4/2010	12.3
3/5/2010	12.6
3/6/2010	12.8
3/7/2010	13.1
3/8/2010	13.5
3/9/2010	13.8
3/10/2010	13.8
3/11/2010	14.7
3/12/2010	14.6
3/13/2010	13.8
3/14/2010	13.2
3/15/2010	12.9
3/16/2010	12.9
3/17/2010	14.5
3/18/2010	14.2
3/19/2010	14.8
3/20/2010	14.9
3/21/2010	14.5
3/22/2010	15.1
3/23/2010	14.1
3/24/2010	15.7
3/25/2010	15.9
3/26/2010	15
3/27/2010	14.4
3/28/2010	14.3
3/29/2010	14.3
3/30/2010	14.6
3/31/2010	15
4/1/2010	15.3
4/2/2010	16.8
4/3/2010	15.5
4/4/2010	16.4
4/5/2010	17.2
4/6/2010	18.2
4/7/2010	17.6
4/8/2010	18.7
4/9/2010	16.9
4/10/2010	16.1
4/11/2010	17.1
4/12/2010	18
4/13/2010	18
4/14/2010	17.1
4/15/2010	17.8
4/16/2010	18.7
4/17/2010	18.2
4/18/2010	16.8
4/19/2010	17.6
4/20/2010	18
4/21/2010	17.8
4/22/2010	18.6

Date	Effluent Temp. °C
3/1/2010	12.4
3/2/2010	12.8
3/3/2010	12.3
3/4/2010	12.3
3/5/2010	12.6
3/6/2010	12.8
3/7/2010	13.1
3/8/2010	13.5
3/9/2010	13.8
3/10/2010	13.8
3/11/2010	14.7
3/12/2010	14.6
3/13/2010	13.8
3/14/2010	13.2
3/15/2010	12.9
3/16/2010	12.9
3/17/2010	14.5
3/18/2010	14.2
3/19/2010	14.8
3/20/2010	14.9
3/21/2010	14.5
3/22/2010	15.1
3/23/2010	14.1
3/24/2010	15.7
3/25/2010	15.9
3/26/2010	15
3/27/2010	14.4
3/28/2010	14.3
3/29/2010	14.3
3/30/2010	14.6
3/31/2010	15
4/1/2010	15.3
4/2/2010	16.8
4/3/2010	15.5
4/4/2010	16.4
4/5/2010	17.2
4/6/2010	18.2
4/7/2010	17.6
4/8/2010	18.7
4/9/2010	16.9
4/10/2010	16.1
4/11/2010	17.1
4/12/2010	18
4/13/2010	18
4/14/2010	17.1
4/15/2010	17.8
4/16/2010	18.7
4/17/2010	18.2
4/18/2010	16.8
4/19/2010	17.6
4/20/2010	18
4/21/2010	17.8
4/22/2010	18.6

Date	Effluent Temp. °C
4/23/2010	18.9
4/24/2010	18.2
4/25/2010	18.4
4/26/2010	19.8
4/27/2010	19.3
4/28/2010	17.9
4/29/2010	18.6
4/30/2010	20.1
5/1/2010	19.3
5/2/2010	19.9
5/3/2010	21.3
5/4/2010	21.4
5/5/2010	21.5
5/6/2010	22.6
5/7/2010	22.3
5/8/2010	21.3
5/9/2010	19.9
5/10/2010	20.1
5/11/2010	19.4
5/12/2010	21.5
5/13/2010	20.7
5/14/2010	21.9
5/15/2010	21.3
5/16/2010	21.4
5/17/2010	20.1
5/18/2010	19.6
5/19/2010	21.1
5/20/2010	21.8
5/21/2010	21.8
5/22/2010	20.9
5/23/2010	21.4
5/24/2010	20.7
5/25/2010	21.3
5/26/2010	22.4
5/27/2010	23.9
5/28/2010	22.5
5/29/2010	21.8
5/30/2010	22.3
5/31/2010	23.6
6/1/2010	23
6/2/2010	23.1
6/3/2010	23
6/4/2010	23.6
6/5/2010	23.1
6/6/2010	24.1
6/7/2010	23.8
6/8/2010	22.9
6/9/2010	23
6/10/2010	24.6
6/11/2010	24.4
6/12/2010	24.4
6/13/2010	23.2
6/14/2010	25.2

Date	Effluent Temp. °C
4/23/2010	18.9
4/24/2010	18.2
4/25/2010	18.4
4/26/2010	19.8
4/27/2010	19.3
4/28/2010	17.9
4/29/2010	18.6
4/30/2010	20.1
5/1/2010	19.3
5/2/2010	19.9
5/3/2010	21.3
5/4/2010	21.4
5/5/2010	21.5
5/6/2010	22.6
5/7/2010	22.3
5/8/2010	21.3
5/9/2010	19.9
5/10/2010	20.1
5/11/2010	19.4
5/12/2010	21.5
5/13/2010	20.7
5/14/2010	21.9
5/15/2010	21.3
5/16/2010	21.4
5/17/2010	20.1
5/18/2010	19.6
5/19/2010	21.1
5/20/2010	21.8
5/21/2010	21.8
5/22/2010	20.9
5/23/2010	21.4
5/24/2010	20.7
5/25/2010	21.3
5/26/2010	22.4
5/27/2010	23.9
5/28/2010	22.5
5/29/2010	21.8
5/30/2010	22.3
5/31/2010	23.6

11/1/2010	21
11/2/2010	20.7
11/3/2010	20.9
11/4/2010	20.6
11/5/2010	20.5
11/6/2010	19.6
11/7/2010	19.9
11/8/2010	20.4
11/9/2010	20.1
11/10/2010	20.8
11/11/2010	20.2
11/12/2010	20.2
11/13/2010	19.2
11/14/2010	19.4

Date	Effluent Temp. °C
6/15/2010	25.7
6/16/2010	24.8
6/17/2010	26.2
6/18/2010	25.7
6/19/2010	24.7
6/20/2010	25.2
6/21/2010	27.2
6/22/2010	26
6/23/2010	26.8
6/24/2010	26.5
6/25/2010	26.6
6/26/2010	25.8
6/27/2010	26
6/28/2010	27
6/29/2010	26.4
6/30/2010	26.2
7/1/2010	26.1
7/2/2010	26.3
7/3/2010	23.9
7/4/2010	25.1
7/5/2010	27
7/6/2010	26.7
7/7/2010	27.2
7/8/2010	27.3
7/9/2010	27.5
7/10/2010	26.3
7/11/2010	26.2
7/12/2010	26.1
7/13/2010	26.8
7/14/2010	27
7/15/2010	27.7
7/16/2010	27.9
7/17/2010	27.3
7/18/2010	26.9
7/19/2010	27.3
7/20/2010	27.2
7/21/2010	27.1
7/22/2010	28.2
7/23/2010	28
7/24/2010	28.2
7/25/2010	27.5
7/26/2010	27.7
7/27/2010	27.4
7/28/2010	28
7/29/2010	28.4
7/30/2010	26.5
7/31/2010	26.9
8/1/2010	26.5
8/2/2010	26.5
8/3/2010	27.4
8/4/2010	27.6
8/5/2010	27.9
8/6/2010	28.1

Date	Effluent Temp. °C
11/15/2010	19.8
11/16/2010	20.3
11/17/2010	20.5
11/18/2010	19.9
11/19/2010	19.7
11/20/2010	19.4
11/21/2010	19
11/22/2010	19.7
11/23/2010	20
11/24/2010	19.8
11/25/2010	19.3
11/26/2010	19.3
11/27/2010	18.9
11/28/2010	17.9
11/29/2010	17.5
11/30/2010	19
12/1/2010	19.4
12/2/2010	17.7
12/3/2010	17.2
12/4/2010	17.3
12/5/2010	16.7
12/6/2010	15.6
12/7/2010	14.6
12/8/2010	14.6
12/9/2010	15.9
12/10/2010	15.2
12/11/2010	14.9
12/12/2010	14.9
12/13/2010	14.2
12/14/2010	13.8
12/15/2010	14
12/16/2010	10.8
12/17/2010	14.9
12/18/2010	14.5
12/19/2010	13.3
12/20/2010	14.1
12/21/2010	13.6
12/22/2010	14.3
12/23/2010	14
12/24/2010	13.6
12/25/2010	13.2
12/26/2010	13.7
12/27/2010	12.9
12/28/2010	13.2
12/29/2010	13.6
12/30/2010	13.5
12/31/2010	14.4
1/1/2011	14
1/2/2011	21.5
1/3/2011	13.6
1/4/2011	13
1/5/2011	13
1/6/2011	14

Date	Effluent Temp. °C
8/7/2010	27
8/8/2010	27
8/9/2010	28.2
8/10/2010	28.5
8/11/2010	29.1
8/12/2010	28.9
8/13/2010	27.1
8/14/2010	27.2
8/15/2010	27.4
8/16/2010	28
8/17/2010	28.7
8/18/2010	28
8/19/2010	27.7
8/20/2010	28
8/21/2010	28.1
8/22/2010	27
8/23/2010	28.1
8/24/2010	27
8/25/2010	26.7
8/26/2010	28.1
8/27/2010	28
8/28/2010	27
8/29/2010	27.1
8/30/2010	27.9
8/31/2010	28.1
9/1/2010	28.5
9/2/2010	28.1
9/3/2010	27.6
9/4/2010	27.8
9/5/2010	27.8
9/6/2010	26.4
9/7/2010	26.8
9/8/2010	27
9/9/2010	27.1
9/10/2010	26.6
9/11/2010	26.1
9/12/2010	25.9
9/13/2010	26.5
9/14/2010	27
9/15/2010	27.4
9/16/2010	27.6
9/17/2010	27.2
9/18/2010	24.7
9/19/2010	26.1
9/20/2010	26.3
9/21/2010	26.8
9/22/2010	26.6
9/23/2010	27.6
9/24/2010	27.8
9/25/2010	26.3
9/26/2010	26.4
9/27/2010	25.2
9/28/2010	26.8

Date	Effluent Temp. °C
1/7/2011	13.5
1/8/2011	13.2
1/9/2011	12.2
1/10/2011	12.3
1/11/2011	12.4
1/12/2011	12.7
1/13/2011	12.6
1/14/2011	12.6
1/15/2011	12.4
1/16/2011	12.7
1/17/2011	12.7
1/18/2011	12.4
1/19/2011	13.6
1/20/2011	13.4
1/21/2011	12.8
1/22/2011	12.5
1/23/2011	11.4
1/24/2011	11.6
1/25/2011	13.1
1/26/2011	12.9
1/27/2011	11.8
1/28/2011	12.2
1/29/2011	12
1/30/2011	12.5
1/31/2011	12.3
2/1/2011	12.6
2/2/2011	14.3
2/3/2011	12.5
2/4/2011	12.3
2/5/2011	10.8
2/6/2011	12.9
2/7/2011	13.8
2/8/2011	13.4
2/9/2011	13.2
2/10/2011	13
2/11/2011	12.9
2/12/2011	12.7
2/13/2011	12.8
2/14/2011	13.8
2/15/2011	14.1
2/16/2011	14.1
2/17/2011	14.6
2/18/2011	16
2/19/2011	13.7
2/20/2011	13.4
2/21/2011	14.2
2/22/2011	13.3
2/23/2011	14.3
2/24/2011	14.6
2/25/2011	15.3
2/26/2011	13.7
2/27/2011	14.5
2/28/2011	15.9

Date	Effluent Temp. °C
9/29/2010	24.5
9/30/2010	24
10/1/2010	24.4
10/2/2010	24.7
10/3/2010	23.4
10/4/2010	23.6
10/5/2010	22.6
10/6/2010	23.8
10/7/2010	23.6
10/8/2010	24.1
10/9/2010	23.7
10/10/2010	23.6
10/11/2010	24.4
10/12/2010	25.4
10/13/2010	24.5
10/14/2010	24
10/15/2010	22.6
10/16/2010	23.4
10/17/2010	21.6
10/18/2010	23.2
10/19/2010	23.1
10/20/2010	22.9
10/21/2010	22.6
10/22/2010	22.8
10/23/2010	21.1
10/24/2010	21.4
10/25/2010	22.7
10/26/2010	23.1
10/27/2010	23.9
10/28/2010	24
10/29/2010	22.6
10/30/2010	20.6
10/31/2010	21.4
11/1/2010	21
11/2/2010	20.7
11/3/2010	20.9
11/4/2010	20.6
11/5/2010	20.5
11/6/2010	19.6
11/7/2010	19.9
11/8/2010	20.4
11/9/2010	20.1
11/10/2010	20.8
11/11/2010	20.2
11/12/2010	20.2
11/13/2010	19.2
11/14/2010	19.4
11/15/2010	19.8
11/16/2010	20.3
11/17/2010	20.5
11/18/2010	19.9
11/19/2010	19.7
11/20/2010	19.4

Date	Effluent Temp. °C
90th % (winter)	21.1

Date	Effluent Temp. °C
11/21/2010	19
11/22/2010	19.7
11/23/2010	20
11/24/2010	19.8
11/25/2010	19.3
11/26/2010	19.3
11/27/2010	18.9
11/28/2010	17.9
11/29/2010	17.5
11/30/2010	19
12/1/2010	19.4
12/2/2010	17.7
12/3/2010	17.2
12/4/2010	17.3
12/5/2010	16.7
12/6/2010	15.6
12/7/2010	14.6
12/8/2010	14.6
12/9/2010	15.9
12/10/2010	15.2
12/11/2010	14.9
12/12/2010	14.9
12/13/2010	14.2
12/14/2010	13.8
12/15/2010	14
12/16/2010	10.8
12/17/2010	14.9
12/18/2010	14.5
12/19/2010	13.3
12/20/2010	14.1
12/21/2010	13.6
12/22/2010	14.3
12/23/2010	14
12/24/2010	13.6
12/25/2010	13.2
12/26/2010	13.7
12/27/2010	12.9
12/28/2010	13.2
12/29/2010	13.6
12/30/2010	13.5
12/31/2010	14.4
1/1/2011	14
1/2/2011	21.5
1/3/2011	13.6
1/4/2011	13
1/5/2011	13
1/6/2011	14
1/7/2011	13.5
1/8/2011	13.2
1/9/2011	12.2
1/10/2011	12.3
1/11/2011	12.4
1/12/2011	12.7

Date	Effluent Temp. °C

Date	Effluent Temp. °C
1/13/2011	12.6
1/14/2011	12.6
1/15/2011	12.4
1/16/2011	12.7
1/17/2011	12.7
1/18/2011	12.4
1/19/2011	13.6
1/20/2011	13.4
1/21/2011	12.8
1/22/2011	12.5
1/23/2011	11.4
1/24/2011	11.6
1/25/2011	13.1
1/26/2011	12.9
1/27/2011	11.8
1/28/2011	12.2
1/29/2011	12
1/30/2011	12.5
1/31/2011	12.3
2/1/2011	12.6
2/2/2011	14.3
2/3/2011	12.5
2/4/2011	12.3
2/5/2011	10.8
2/6/2011	12.9
2/7/2011	13.8
2/8/2011	13.4
2/9/2011	13.2
2/10/2011	13
2/11/2011	12.9
2/12/2011	12.7
2/13/2011	12.8
2/14/2011	13.8
2/15/2011	14.1
2/16/2011	14.1
2/17/2011	14.6
2/18/2011	16
2/19/2011	13.7
2/20/2011	13.4
2/21/2011	14.2
2/22/2011	13.3
2/23/2011	14.3
2/24/2011	14.6
2/25/2011	15.3
2/26/2011	13.7
2/27/2011	14.5
2/28/2011	15.9
90th % (annual)	27.4

Date	Effluent Temp. °C

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: SCWWA Permit No.: VA0025437

Receiving Stream: Appomattox River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	28.7	mg/L	1Q10 (Annual) =	0.9	MGD	Annual - 1Q10 Mix =	100	%	Mean Hardness (as CaCO3) =	51.9	mg/L
90% Temperature (Annual) =	27	deg C	7Q10 (Annual) =	1.6	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	27.4	deg C
90% Temperature (Wet season) =	19.5	deg C	30Q10 (Annual) =	1.6	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =	21.1	deg C
90% Maximum pH =	8	SU	1Q10 (Wet season) =	0.9	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	7.3	SU
10% Maximum pH =	6.7	SU	30Q10 (Wet season)	1.6	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =	6.6	SU
Tier Designation (1 or 2) =	1		30Q5 =	1.6	MGD				Discharge Flow =	1	MGD
Public Water Supply (PWS) Y/N? =	N		Harmonic Mean =	1.6	MGD						
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	6.5E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+00**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	5.7E+00	--	na	1.3E-03	--	--	--	--	--	--	--	--	**5.7E+00**	**--**	**na**	**1.3E-03**
Ammonia-N (mg/l) (Yearly)	0	1.97E+01	1.77E+00	na	--	3.74E+01	4.60E+00	na	--	--	--	--	--	--	--	--	--	**3.74E+01**	**4.60E+00**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	1.97E+01	2.79E+00	na	--	3.74E+01	7.24E+00	na	--	--	--	--	--	--	--	--	--	**3.74E+01**	**7.24E+00**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+05**
Antimony	0	--	--	na	6.4E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+03**
Arsenic	0	3.4E+02	1.5E+02	na	--	6.5E+02	3.9E+02	na	--	--	--	--	--	--	--	--	--	**6.5E+02**	**3.9E+02**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+03**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	5.2E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E-03**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	5.7E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.7E+01**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+03**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E+03**
Cadmium	0	1.4E+00	5.3E-01	na	--	2.7E+00	1.4E+00	na	--	--	--	--	--	--	--	--	--	**2.7E+00**	**1.4E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	4.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.6E+00	1.1E-02	na	2.1E-02	--	--	--	--	--	--	--	--	**4.6E+00**	**1.1E-02**	**na**	**2.1E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	1.6E+06	6.0E+05	na	--	--	--	--	--	--	--	--	--	**1.6E+06**	**6.0E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	3.6E+01	2.9E+01	na	--	--	--	--	--	--	--	--	--	**3.6E+01**	**2.9E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.6E-01	1.1E-01	na	--	--	--	--	--	--	--	--	--	**1.6E-01**	**1.1E-01**	**na**	**--**
Chromium III	0	2.7E+02	3.3E+01	na	--	5.2E+02	8.7E+01	na	--	--	--	--	--	--	--	--	--	**5.2E+02**	**8.7E+01**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.0E+01	2.9E+01	na	--	--	--	--	--	--	--	--	--	**3.0E+01**	**2.9E+01**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	4.7E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-02**
Copper	0	5.8E+00	3.9E+00	na	--	1.1E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	**1.1E+01**	**1.0E+01**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.2E+01	1.4E+01	na	4.2E+04	--	--	--	--	--	--	--	--	**4.2E+01**	**1.4E+01**	**na**	**4.2E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	8.1E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E-03**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	5.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.7E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.1E+00	2.6E-03	na	5.7E-03	--	--	--	--	--	--	--	--	**2.1E+00**	**2.6E-03**	**na**	**5.7E-03**
Demeton	0	--	1.0E-01	na	--	--	2.6E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.6E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	3.2E-01	4.4E-01	na	--	--	--	--	--	--	--	--	--	**3.2E-01**	**4.4E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	3.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	7.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.3E-01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E+02**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	9.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.6E+02**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	7.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.5E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+02**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	5.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.5E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.6E-01	1.5E-01	na	1.4E-03	--	--	--	--	--	--	--	--	**4.6E-01**	**1.5E-01**	**na**	**1.4E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.9E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	7.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.3E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	8.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.8E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.3E-07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	5.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.5E-01	na	2.3E+02	--	--	--	--	--	--	--	--	**4.2E-01**	**1.5E-01**	**na**	**2.3E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.5E-01	na	2.3E+02	--	--	--	--	--	--	--	--	**4.2E-01**	**1.5E-01**	**na**	**2.3E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.2E-01	1.5E-01	--	--	--	--	--	--	--	--	--	--	**4.2E-01**	**1.5E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.6E-01	9.4E-02	na	1.6E-01	--	--	--	--	--	--	--	--	**1.6E-01**	**9.4E-02**	**na**	**1.6E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	7.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.8E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	5.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.5E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	2.6E-02	na	--	--	--	--	--	--	--	--	--	**--**	**2.6E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	9.9E-01	9.9E-03	na	2.1E-03	--	--	--	--	--	--	--	--	**9.9E-01**	**9.9E-03**	**na**	**2.1E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	9.9E-01	9.9E-03	na	1.0E-03	--	--	--	--	--	--	--	--	**9.9E-01**	**9.9E-03**	**na**	**1.0E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	7.5E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.5E-03**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	4.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	4.4E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.8E+00	--	na	4.7E+00	--	--	--	--	--	--	--	--	**1.8E+00**	**--**	**na**	**4.7E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	8.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.6E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	5.2E+00	na	--	--	--	--	--	--	--	--	--	**--**	**5.2E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	3.8E+01	3.9E+00	na	--	7.2E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	**7.2E+01**	**1.0E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	2.6E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.6E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	2.7E+00	2.0E+00	- -	- -	--	--	--	--	--	--	--	--	**2.7E+00**	**2.0E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	7.8E-02	na	--	--	--	--	--	--	--	--	--	**--**	**7.8E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	0	8.6E+01	8.9E+00	na	4.6E+03	1.6E+02	2.3E+01	na	1.2E+04	--	--	--	--	--	--	--	--	**1.6E+02**	**2.3E+01**	**na**	**1.2E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	7.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.8E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.3E+01	1.7E+01	na	--	--	--	--	--	--	--	--	--	**5.3E+01**	**1.7E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	1.2E-01	3.4E-02	na	--	--	--	--	--	--	--	--	--	**1.2E-01**	**3.4E-02**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	3.6E-02	na	1.7E-03	--	--	--	--	--	--	--	--	**--**	**3.6E-02**	**na**	**1.7E-03**
Pentachlorophenol [C]	0	6.1E+00	4.7E+00	na	3.0E+01	1.2E+01	1.2E+01	na	7.8E+01	--	--	--	--	--	--	--	--	**1.2E+01**	**1.2E+01**	**na**	**7.8E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+04**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	3.8E+01	1.3E+01	na	1.1E+04	--	--	--	--	--	--	--	--	**3.8E+01**	**1.3E+01**	**na**	**1.1E+04**
Silver	0	7.4E-01	--	na	--	1.4E+00	--	na	--	--	--	--	--	--	--	--	--	**1.4E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	8.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	1.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.4E+00	5.2E-04	na	7.3E-03	--	--	--	--	--	--	--	--	**1.4E+00**	**5.2E-04**	**na**	**7.3E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.7E-01	1.9E-01	na	--	--	--	--	--	--	--	--	--	**8.7E-01**	**1.9E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.8E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	6.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	6.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+01**
Zinc	0	5.5E+01	5.2E+01	na	2.6E+04	1.0E+02	1.3E+02	na	6.8E+04	--	--	--	--	--	--	--	--	**1.0E+02**	**1.3E+02**	**na**	**6.8E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.7E+03
Arsenic	2.3E+02
Barium	na
Cadmium	8.2E-01
Chromium III	5.2E+01
Chromium VI	1.2E+01
Copper	4.4E+00
Iron	na
Lead	6.1E+00
Manganese	na
Mercury	1.1E+00
Nickel	1.4E+01
Selenium	7.8E+00
Silver	5.6E-01
Zinc	4.2E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

3/9/2012 11:10:51 AM

Facility = SCWWA
Chemical = Ammonia as N (Jun - Oct)
Chronic averaging period = 30
WLAa = 37.4 mg/L
WLAc = 4.60 mg/L
Q.L. = 0.20 mg/L
# samples/mo. = 20
# samples/wk. = 5

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007 mg/L
97th percentile 4 day average = 14.9741 mg/L
97th percentile 30 day average= 10.8544 mg/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 9.28128242971503 mg/L
Average Weekly limit = 6.04915304150507 mg/L
Average Monthly LImit = 4.7766284124922 mg/L

The data are:

9.00 mg/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 9.00 mg/L in order to force a limit.

3/9/2012 11:11:55 AM

Facility = scwwa
Chemical = Ammonia as N (Nov - May)
Chronic averaging period = 30
WLAa = 37.4 mg/L
WLAc = 7.24 mg/L
Q.L. = 0.20 mg/L
# samples/mo. = 20
# samples/wk. = 5

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007 mg/L
97th percentile 4 day average = 14.9741 mg/L
97th percentile 30 day average= 10.8544 mg/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.6079314763341 mg/L
Average Weekly limit = 9.52084087402103 mg/L
Average Monthly LImit = 7.51799776227033 mg/L

The data are:

9.00 mg/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 9.00 mg/L in order to force a limit.

9/20/2011 3:32:34 PM

Facility = SCWWA
Chemical = Chloride
Chronic averaging period = 4
WLAa = 1600000 ug/L
WLAc = 600000 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 71133.3
Variance = 1821582
C.V. = 0.6
97th percentile daily values = 173097. ug/L
97th percentile 4 day average = 118350. ug/L
97th percentile 30 day average= 85790.5 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

60000 ug/L
83000 ug/L
70400 ug/L

9/23/2011 4:24:06 PM

Facility = SCWWA
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.036 mg/L
WLAc = 0.029 mg/L
Q.L. = 0.10 mg/L
# samples/mo. = 360
# samples/wk. = 84

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683 mg/L
97th percentile 4 day average = 33.2758 mg/L
97th percentile 30 day average= 24.1210 mg/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.036 mg/L
Average Weekly limit = 1.66947237511022E-02 mg/L
Average Monthly LImit = 1.56739924577879E-02 mg/L

The data are:

20 mg/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 20 mg/L in order to force a limit.

3/9/2012 11:29:09 AM

Facility = SCWWA
Chemical = Dissolved Copper
Chronic averaging period = 4
WLAa = 11 ug/L
WLAc = 10 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 5.17498
Variance = 1.90586
C.V. = 0.266769
97th percentile daily values = 8.18790 ug/L
97th percentile 4 day average = 6.58510 ug/L
97th percentile 30 day average= 5.64909 ug/L
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

6 ug/L
3 ug/L
7 ug/L
4.1 ug/L
4.6 ug/L
5.8 ug/L
4.2 ug/L
4.4 ug/L
6.5 ug/L
5.9 ug/L

9/20/2011 3:27:25 PM

Facility = SCWWA
Chemical = Dissolved Mercury
Chronic averaging period = 4
WLAa = 2.7 ug/L
WLAc = 2 ug/L
Q.L. = 0.001 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .0038
Variance = .000005
C.V. = 0.6
97th percentile daily values = .009246 ug/L
97th percentile 4 day average = .006322 ug/L
97th percentile 30 day average= .004583 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.0038 ug/L

9/20/2011 3:28:35 PM

Facility = SCWWA
Chemical = Dissolved Zinc
Chronic averaging period = 4
WLAa = 100 ug/L
WLAc = 130 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 36.6666
Variance = 484
C.V. = 0.6
97th percentile daily values = 89.2253 ug/L
97th percentile 4 day average = 61.0056 ug/L
97th percentile 30 day average= 44.2219 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

38 ug/L
33 ug/L
39 ug/L

2006 PERMIT

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: SCWWA Permit No.: VA0025437

Receiving Stream: Appomattox River WINTER AMMONIA

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	28.7	mg/L
90% Temperature (Annual) =		deg C
90% Temperature (Wet season) =	19.93	deg C
90% Maximum pH =	7.95	SU
10% Maximum pH =	6.8	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	N	
Trout Present Y/N? =	N	
Early Life Stages Present Y/N? =	Y	

Stream Flows

1Q10 (Annual) =	0.9	MGD
7Q10 (Annual) =	1.6	MGD
30Q10 (Annual) =	1.6	MGD
1Q10 (Wet season) =	0.9	MGD
30Q10 (Wet season)	1.6	MGD
30Q5 =		MGD
Harmonic Mean =		MGD
Annual Average =		MGD

Mixing Information

Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information

Mean Hardness (as CaCO3) =	80	mg/L
90% Temp (Annual) =	23.2	deg C
90% Temp (Wet season) =	13.7	deg C
90% Maximum pH =	7.59	SU
10% Maximum pH =	7.1	SU
Discharge Flow =	1	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	--	--	na	7.8E+02
Acrylonitrile[C]	0	--	--	na	6.6E+00	--	--	na	6.6E+00	--	--	--	--	--	--	--	--	--	--	na	6.6E+00
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	5.7E+00	--	na	1.4E-03	--	--	--	--	--	--	--	--	5.7E+00	--	na	1.4E-03
Ammonia-N (mg/l) (Yearly)	0	1.38E+01	3.28E+00	na	--	2.6E+01	8.5E+00	na	--	--	--	--	--	--	--	--	--	2.6E+01	8.5E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.38E+01	2.70E+00	na	--	2.6E+01	7.0E+00	na	--	--	--	--	--	--	--	--	--	2.6E+01	7.0E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.5E+02	3.9E+02	na	--	--	--	--	--	--	--	--	--	6.5E+02	3.9E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	--	--	na	7.1E+02
Benzidine[C]	0	--	--	na	5.4E-03	--	--	na	5.4E-03	--	--	--	--	--	--	--	--	--	--	na	5.4E-03
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	--	--	na	3.6E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	--	--	na	5.2E+03
Cadmium	0	2.0E+00	6.4E-01	na	--	3.9E+00	1.7E+00	na	--	--	--	--	--	--	--	--	--	3.9E+00	1.7E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	4.6E+00	1.1E-02	na	2.2E-02	--	--	--	--	--	--	--	--	4.6E+00	1.1E-02	na	2.2E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.6E+06	6.0E+05	na	--	--	--	--	--	--	--	--	--	1.6E+06	6.0E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.6E+01	2.9E+01	na	--	--	--	--	--	--	--	--	--	3.6E+01	2.9E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04

2006 PERMIT

Ammonia – Summer

Facility = SCWWA
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 26
WLAc = 3.9
Q.L. = .20

samples/mo. = 12
samples/wk. = 3

Summary of Statistics:
observations = 1
Expected Value = 9.00
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 7.86891336432361
Average Weekly limit = 5.75566710556393
Average Monthly Limit = 4.28721970132382

The data are:
9.00

Note: 9.00 mg/L was used to force a limitation per Guidance Memorandum 00-2011. As indicated, the ammonia limitation for June – October is 4.29 mg/L monthly average 5.76 mg/L weekly average. See the discussion below regarding the RCIWQMP.

Ammonia- Winter

Facility = SCWWA
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 26
WLAc = 7
Q.L. = .20
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:
observations = 1
Expected Value = 9.00
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.1236906539142
Average Weekly limit = 10.3306845484481
Average Monthly Limit = 7.69500972032481

The data are:
9.00

Note: 9.00 mg/L was used to force a limitation per Guidance Memorandum 00-2011. As indicated, the ammonia limitation for November – May is 7.70 mg/L monthly average and 10.33 mg/L weekly average. See the discussion below regarding the RCIWQMP.

2006 PERMIT

AMMONIA LIMITATIONS

Limitations for ammonia were evaluated using MSTRANTI derived WLAs and STATS.exe. Since this facility is also governed by 9 VAC 25-720 Water Quality Management Planning Regulation, known as the Richmond Crater Interim Water Quality Management Plan (RICWQMP), the permit limits for the South Central Wastewater Authority (named in the regulation as Petersburg STP) from the regulation and from MSTRANTI/STATS were compared and the more stringent of the two limitations was selected as being most protective of water quality.

The calculations are presented below:

Winter (Nov – May)

RCIWQMP	2028 lb/day
MSTRANTI/STATS	1477 lb/day = 7.695 mg/L x 3.785 gal/L x 23.00 MGD x 2.2046226 lb/kg

As the MSTRANI/STATS limitations are more stringent, these limitations were placed in the permit.

****

Summer (Jun – Oct)

RCIWQMP	801 lb/day
MSTRANTI/STATS	823 lb/day = 4.29 mg/L x 3.785 gal/L x 23.00 MGD x 2.2046226 lb/kg

As the RCIWQMP loading limitations are more stringent, these limitations were used to determine the summer ammonia concentration limitations.

$$\frac{801 \text{ lb/day}}{2.2046226 \text{ lb/kg} \times 3.785 \text{ gal/L} \times 23.00 \text{ MGD}} = 4.17354 \text{ mg/L} \sim 4.17 \text{ mg/L}$$

Attachment I

Excerpt from Richmond-Crater Water Quality Management Plan

RICHMOND-CRATER INTERIM WATER QUALITY MANAGEMENT PLAN

TECHNICAL SUPPORT INFORMATION

Piedmont Regional Office
Water Resources Development Section
Virginia State Water Control Board

March 1988

Table 7-1. Waste Load Allocations for the Years 1990, 2000, and 2010.

YEAR 1990

		SUMMER (June - October)					WINTER (November - May)				
	FLOW	CBOD5		NH3-N		DO*	CBOD5		NH3-N		DO*
	(mgd)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)
City of Richmond STP	45.00	3002	8.0	2403	6.4	5.6	5367	14.3	5707	15.2	5.6
E.I. DuPont-Spruance	11.05	948		590		4.4	948		756		2.9
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9
Proctors Creek STP	12.00	1602	16.0	961	9.6	5.9	2403	24.0	1402	14.0	5.9
Reynolds Metals Company	0.49	172		8		6.5	172		8		6.5
Henrico STP	30.00	3002	12.0	2403	9.6	5.6	4756	19.0	3504	14.0	5.6
American Tobacco Company	2.70	715		113		6.8	715		113		6.8
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1
Philip Morris - Park 500	2.20	819		92		4.6	819		92		4.6
Allied (Chesterfield)	53.00	1255		442		5.7	1255		442		5.7
Allied (Hopewell)	165.00	2750		10326		6.1	2750		10326		6.1
Hopewell Regional WTF	34.07	12502	44.0	10291	36.2	4.8	12502	44.0	10291	36.2	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0	2802	22.4	2028	16.2	5.0
TOTAL	380.81	31084		28978			36679		35958		

YEAR 2000

		SUMMER (June - October)					WINTER (November - May)				
	FLOW	CBOD5		NH3-N		DO*	CBOD5		NH3-N		DO*
	(mgd)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)
City of Richmond STP	45.08	3002	8.0	2403	6.4	5.6	5367	14.3	5707	15.2	5.6
E.I. DuPont-Spruance	16.99	948		590		4.4	948		756		2.9
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9
Proctors Creek STP	16.80	1602	11.4	961	6.9	5.9	2403	17.1	1402	10.0	5.9
Reynolds Metals Company	0.78	172		13		6.5	172		13		6.5
Henrico STP	32.80	3002	11.0	2403	8.8	5.6	4756	17.4	3504	12.8	5.6
American Tobacco Company	3.00	715		113		6.8	715		113		6.8
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1
Philip Morris - Park 500	2.90	819		92		4.6	819		92		4.6
Allied (Chesterfield)	56.00	1255		442		5.7	1255		442		5.7
Allied (Hopewell)	170.00	2750		10326		6.1	2750		10326		6.1
Hopewell Regional WTF	36.78	12502	40.7	10291	33.5	4.8	12502	40.7	10291	33.5	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0	2802	22.4	2028	16.2	5.0
TOTAL	406.43	31084		28982			36679		35963		

YEAR 2010

		SUMMER (June - October)					WINTER (November - May)				
	FLOW	CBOD5		NH3-N		DO*	CBOD5		NH3-N		DO*
	(mgd)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)	(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	(mg/l)
City of Richmond STP	45.86	3002	7.8	2403	6.3	5.6	5367	14.0	5707	14.9	5.6
E.I. DuPont-Spruance	16.99	948		590		4.4	948		756		2.9
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9
Proctors Creek STP	24.00	1602	8.0	961	4.8	5.9	2403	12.0	1402	7.0	5.9
Reynolds Metals Company	0.78	172		13		6.5	172		13		6.5
Henrico STP	38.07	3002	9.5	2403	7.6	5.6	4756	15.0	3504	11.0	5.6
American Tobacco Company	3.00	715		113		6.8	715		113		6.8
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1
Philip Morris - Park 500	2.90	819		92		4.6	819		92		4.6
Allied (Chesterfield)	56.00	1255		442		5.7	1255		442		5.7
Allied (Hopewell)	180.00	2750		10326		6.1	2750		10326		6.1
Hopewell Regional WTF	39.61	12502	37.8	10291	31.1	4.8	12502	37.8	10291	31.1	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0	2802	22.4	2028	16.2	5.0
TOTAL	432.51	31084		28982			36679		35963		

* Dissolved oxygen limits represent average minimum allowable levels.

Attachment J

Whole Effluent Toxicity Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949–A Cox Road **Glen Allen, Virginia 23060** **(804) 527-5020**

TO: Deborah DeBiasi, Whole Effluent Toxicity (WET) Program, DEQ-CO

FROM: Drew Hammond, Water Permit Writer, DEQ-PRO

DATE: July 22, 2011
June 20, 2012 (Revised)

SUBJECT: VPDES Permit No. VA0025437 – South Central Wastewater Authority
WET Testing Data Review

COPIES: File

Facility Name:	South Central Wastewater Authority
Permit Number:	VA0025437
Receiving Stream:	Appomattox River (Outfall 001)
Facility SIC:	4952
Acute In-Stream Waste Concentration (IWC_{acute}):	52.6% (previously established tidal dilution ratio of 1.9:1 utilized)
Chronic In-Stream Waste Concentration ($IWC_{chronic}$):	38.5% (previously established tidal dilution ratio of 2.6:1 utilized)

Background

The 2006 Virginia Pollutant Discharge Elimination System (VPDES) permit for South Central Wastewater Authority is in the process of reissuance. The 2006 permit authorized the discharge of treated sewage wastewaters at a rate of 23 million gallons per day into the Appomattox River in Petersburg, Virginia. The 2006 permit was modified in April 2010 to insert nutrient concentration limitations based upon proposed nutrient removal technology approved with a Certificate-to-Construct dated August 20, 2009. The existing VPDES permit expired on December 20, 2011 and has been administratively continued.

Permit Requirements

The expiring VPDES permit contains Whole Effluent Toxicity (WET) testing for Outfall 001. More specifically, the WET testing special condition requires annual Chronic 3-Brood Static Renewal Survival and Reproduction tests using *Ceriodaphina dubia* and annual Chronic 7-Day Static Renewal Survival and Growth tests using *Pimephales promelas*. The special condition set the chronic endpoint of NOEC equal to 27% (TU_c of 3.70).

Data Summary

This data review includes the results of five (5) sets of annual testing for Outfall 001. Three (3) sets of the WET tests were performed by Olver Incorporated and the remaining WET tests were performed by Coastal Bioanalysts, Inc. (CBI). No quality control problems were found.

Table 1. Results of the Chronic WET Tests for *Ceriodaphina dubia* – Outfall 001

Test Date	NOEC Survival	NOEC Reproduction	Laboratory
9/11/2007	100	100	Olver
9/23/2008	100	100	Olver
4/21/2009	100	100	Olver
3/15/2010	100	100	CBI
4/4/2011	100	100	CBI

Table 2. Results of the Chronic WET Tests for *Pimephales promelas* – Outfall 001

Test Date	NOEC Survival	NOEC Growth	Laboratory
9/12/2007	100	100	Olver
10/28/2008	100	39	Olver
4/21/2009	100	100	Olver
3/15/2010	100	52	CBI
4/4/2011	100	52	CBI

Data Analysis

In accordance with agency guidance, acute and chronic wasteload allocations were developed for Outfall 001 using WETLIM10.xls (see attached). It is noted that 10 data points for the same species were not available to develop a site specific coefficient of variation (CV). In addition, all LC_{50} results were reported as greater than 100%. Therefore, a site specific acute-to-chronic ratio (ACR) was not calculated. The wasteload allocations along with chronic NOEC data (expressed as chronic toxic units) were entered into STATS.exe and a reasonable potential analysis was performed using *Ceriodaphina dubia* and *Pimephales promelas* (see attached).

Conclusions & Recommendations

The results of the chronic WET tests for Outfall 001 are summarized in Tables 1 and 2 above. The facility's effluent met the WET testing special condition of chronic NOEC equal to 27% (TU_c of 3.70) in 100% of the tests conducted between 2007 and 2011. However, the reasonable potential analysis for *Pimephales promelas* indicated the need for a permit limitation based upon chronic toxicity. The chronic limitation of 3.8 TU_c will be included in Part I.A of the 2012 permit. In addition, a schedule of compliance will be included in the 2012 permit. This schedule will provide the permittee with an opportunity to perform a toxicity reduction evaluation (i.e. time to identify and eliminate potential sources of toxicity) prior to the limitation becoming effective.

The WET testing special condition language to be included in the 2012 permit reissuance is as follows:

E. Whole Effluent Toxicity (WET) Limitations and Monitoring Requirements

1. The Whole Effluent Toxicity Limitation of 3.8 TU_c (NOEC >/= 27%) in Part I.A shall become effective no later than four (4) years following the effective date of this permit as specified in Part I.H – Schedule of Compliance.

2. Within the first calendar quarter following the effective date of this limitation, the permittee shall conduct quarterly chronic toxicity tests using 24-hour flow-proportioned composite samples of final effluent from Outfall 001.

   The chronic test to use is:

   Chronic 7-Day Static Renewal Survival and Growth Test using *Pimephales promelas*

   These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction. The test endpoint (limit) must be represented by a dilution, and if other than 100%, should be bracketed by at least one dilution above and one dilution below it. Results which cannot be determined (i.e. a "less than" NOEC value) are not acceptable, and a retest will have to be performed. A retest of a non-acceptable test must be performed during the same compliance period as the test it is replacing. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. The IC_{25} should be included on the submitted test reports. A copy of the toxicity test results shall be submitted to the DEQ Piedmont Regional Office.

   Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

3. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters.

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	07/20/11
Facility Name:	SCWWA
VPDES Number:	VA0025437
Outfall Number:	4

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE 100% = NOAEC LC_{50} = NA % Use as NA TUa

ACUTE WLAa 0.57

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	3.802694178	TU_c	NOEC =	27	% Use as	3.70	TU_c
BOTH*	5.70000014	TU_c	NOEC =	18	% Use as	5.55	TU_c
AML	3.802694178	TU_c	NOEC =	27	% Use as	3.70	TU_c

ACUTE WLAa,c 5.7
CHRONIC WLAc 2.6
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.56269691 a limit may result using WLA.EXE

% Flow to be used from MIX.EXE

Plant Flow:	23	MGD	
Acute 1Q10:		MGD	%
Chronic 7Q10:		MGD	%

Difuser /modeling study?

Enter Y/N Y
Acute 1.9 :1
Chronic 2.6 :1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	52.63157895	%	Plant flow/plant flow + 1Q10
IWC_c	38.46153846	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	1.9	100/IWCa
Dilution, chronic	2.6	100/IWCc

WLA_a	0.57	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	2.6	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	5.7	ACR X's WLA_a - converts acute WLA to chronic units

ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)

Constants	eA	0.4109447	Default = 0.41
	eB	0.6010373	Default = 0.60
	eC	2.4334175	Default = 2.43
	eD	2.4334175	Default = 2.43 (1 samp)

No. of samples 1

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	2.34238479	WLAa,c X's eA							
LTA_c	1.56269698	WLAc X's eB					Rounded NOEC's		%
MDL** with $LTA_{a,c}$	5.70000014	TU_c	NOEC =	17.543859	(Protects from acute/chronic toxicity)		NOEC =	18	%
MDL** with LTA_c	3.802694178	TU_c	NOEC =	26.297145	(Protects from chronic toxicity)		NOEC =	27	%
AML with lowest LTA	3.802694178	TU_c	NOEC =	26.297145	Lowest LTA X's eD		NOEC =	27	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

							Rounded LC50's		%
MDL with $LTA_{a,c}$	0.570000014	TU_a	LC50 =	175.438592	%	Use NOAEC=100%	LC50 =	NA	%
MDL with LTA_c	0.380269418	TU_a	LC50 =	262.971449	%	Use NOAEC=100%	LC50 =	NA	

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = **1** This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1			1	
2			2	
3			3	
4			4	
5			5	
6			6	
7			7	
8			8	
9			9	
10			10	
11			11	
12			12	
13			13	
14			14	
15			15	
16			16	
17			17	
18			18	
19			19	
20			20	
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA	100	1.000000
2		NO DATA	39	2.564103
3		NO DATA	100	1.000000
4		NO DATA	52	1.923077
5		NO DATA	52	1.923077
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	64.0	1.562697		
Dilution series to use for limit			27	3.7037037
Dilution factor to recommend:	0.7999496		0.5196152	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	80.0	1.25	52.0	1.92
	64.0	1.56	27.0	3.70
	51.2	1.95	14.0	7.13
	40.95	2.44	7.3	13.72
Extra dilutions if needed	32.76	3.05	3.8	26.40
	26.20	3.82	2.0	50.81

7/22/2011 11:13:46 AM

Facility = South Central Wastewater Authority
Chemical = Chronic - C. dubia
Chronic averaging period = 4
WLAa = 5.7
WLAc = 2.6
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1
1
1
1

7/21/2011 12:38:38 PM

Facility = South Central Wastewater Authority
Chemical = Chronic - P. promelas
Chronic averaging period = 4
WLAa   = 5.7
WLAc   = 2.6
Q.L.   = 1
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value = 1.68
Variance   = 1.01606
C.V.   = 0.6
97th percentile daily values = 4.08814
97th percentile 4 day average = 2.79516
97th percentile 30 day average= 2.02616
< Q.L.   = 0
Model used   = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 3.8026944385384
Average Weekly limit = 3.8026944385384
Average Monthly LImit = 3.8026944385384

The data are:

 1
 2.56
 1
 1.92
 1.92

Hammond, Andrew (DEQ)

From: DeBiasi, Deborah (DEQ)
Sent: Wednesday, June 20, 2012 5:15 PM
To: Hammond, Andrew (DEQ)
Subject: RE: VA0025437 - SCWWA - WET Testing Data Review

Just a few comments:

1. In this part, add "sets"

Data Summary
This data review includes the results of 5 sets of annual testing for Outfall 001. Three sets ~~(3)~~ of the WET tests were performed by Olver Incorporated and the remaining WET tests were performed by Coastal Bioanalysts, Inc. (CBI).

2. I'd take out "no later than" here:

E. Whole Effluent Toxicity (WET) Limitations and Monitoring Requirements
1. The Whole Effluent Toxicity Limitation of 3.8 TU_c (NOEC >/= 27%) in Part I.A shall become effective ~~no later than~~ four (4) years following the effective date of this permit as specified in Part I.H – Schedule of Compliance.

3. I'd get away from the "no later than" language and use "within" here:

~~No later than~~ Within the first calendar quarter following the effective date of this limitation, the permittee shall conduct quarterly chronic toxicity tests using 24-hour flow-proportioned composite samples of final effluent from Outfall 001.

I would also clarify the language about "including a copy of the test report" to "sending a copy of the test report to the PRO", since EDMR can't handle the size of toxicity reports.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Hammond, Andrew (DEQ)
Sent: Wednesday, June 20, 2012 4:01 PM
To: DeBiasi, Deborah (DEQ)
Subject: RE: VA0025437 - SCWWA - WET Testing Data Review

Good afternoon, Deborah,

Attached is my revised WET memo for South Central Wastewater Authority for your review. In response to owner comments, I have included a 4-year schedule of compliance for the new chronic WET limitation (as we previously discussed). As a result, there was a need to update the WET language included in the draft permit.

Please let me know if you have any questions.

Thanks,
Drew

From: DeBiasi, Deborah (DEQ)
Sent: Wednesday, October 05, 2011 4:15 PM
To: Hammond, Andrew (DEQ)
Subject: VA0025437 - SCWWA - WET Testing Data Review

Drew,

The WET language for SCWWA that you have proposed is appropriate for this permit. You may want to suggest the dilution series calculated on page 4 of the spreadsheet in the fact sheet (not the permit).

Please let me know if you have any questions.

Deborah

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Hammond, Andrew (DEQ)
Sent: Wednesday, October 05, 2011 12:39 PM
To: DeBiasi, Deborah (DEQ)
Subject: VA0025437 - SCWWA - WET Testing Data Review

Hi Deborah,

You gave me verbal concurrence on this memo back in July. Will you please send me written concurrence so that I can include it in my fact sheet in order to address a QAQC comment.

Thanks,
Drew

Andrew J. Hammond II, P.E.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph: 804.527.5048
Fx: 804.527.5106
Andrew.Hammond@deq.virginia.gov

From: Hammond, Andrew (DEQ)
Sent: Friday, July 22, 2011 11:24 AM
To: DeBiasi, Deborah (DEQ)
Subject: VA0025437 - SCWWA - WET Testing Data Review

Deborah,

Thanks again for sending me the WET special condition language. Attached is my WET testing data review (with proposed 2011 permit language) for SCWWA for your review and concurrence.

Thanks,

Drew

Andrew J. Hammond II, P.E.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph: 804.527.5048
Fx: 804.527.5106
Andrew.Hammond@deq.virginia.gov

Attachment K

Threatened & Endangered Species Coordination Comments

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

June 28, 2011

Andrew Hammond
DEQ-PRO
4949-A Cox Road
Glen Allen, VA 23060

Re: VA0025437, South Central Wastewater Authority

Dear Mr. Hammond:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Yellow lampmussel (*Lampsilis cariosa*, G3G4/S2/NL/NL) and Green floater (*Lasmigona subviridis*, G3/S2/NL/LT) have been historically documented in the Appomattox River . The Yellow lampmussel ranges from Nova Scotia to Georgia in Atlantic slope drainages (NatureServe, 2009). In Virginia, it is recorded from the Roanoke, Chowan, James, York, and Potomac drainages. It is found in larger streams and rivers where good currents exist over sand and gravel substrates and in small creeks and ponds (Johnson, 1970).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

The Green floater, a rare freshwater mussel, ranges from New York to North Carolina in the Atlantic Slope drainages, as well as the New and Kanawha River systems in Virginia and West Virginia (NatureServe, 2009). In Virginia, there are records from the New, Roanoke, Chowan, James, York, Rappahannock, and Potomac River drainages. Throughout its range, the Green floater appears to prefer the pools and eddies with gravel and sand bottoms of smaller rivers and creeks, smaller channels of large rivers (Ortman, 1919) or small to medium-sized streams (Riddick, 1973). Please note that this species has been listed as state threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to storm water management laws/regulations and utilization of new technologies as they become available to improve water quality.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

CC: Amy Ewing, VDGIF

Literature Cited

Johnson, R.I. 1970. The systematics and zoogeography of the Unionidae (Mullusca: Bilvava) of the southern Atlantic slope region. Bulletin Museum of Comparative Zoology vol 140(6): 362-365.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: April 27, 2010).

Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18: 6-9.

Attachment L

Reduced Monitoring Evaluation

South Central Wastewater Authority (SCWWA)

Reduced Monitoring Evaluation
(Section MN-2, GM 10-2003, VPDES Permit Manual)

Section MN-2 (page 2) of GM 10-2003 states in part, "To qualify for consideration of reduced monitoring requirements, the facility should not have been issued any Warning Letters, NOVs [notices of violation], or NULEs [notices of unsatisfactory laboratory examination], or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years… The ban on monitoring reductions applies if any part of the sewerage system, including another outfall at the treatment plant or collection lines owned by another person, has been subject to enforcement action in the past 3 years." The City of Petersburg, which discharges to SCWWA, was issued a NOV on 10/8/2010 for seven (7) sanitary sewer overflows and/or unpermitted discharges from their sewage collection system. Therefore, strictly adhering to guidance would potentially disqualify this facility for consideration of reduced effluent monitoring. In an effort to solidify their position for consideration of reduced effluent monitoring for this permit reissuance, SCWWA submitted documentation (see Attachment M) demonstrating that facility operations and/or maintenance did not cause nor contribute to the sanitary sewer overflows in the City of Petersburg. Therefore, a reduced monitoring evaluation has been performed in accordance with Section MN-2 of GM 10-2003 utilizing best engineering judgment.

The reduced monitoring evaluation is summarized as follows:

- pH: According to GM 10-2003, reduced pH monitoring should not be allowed where minimum or maximum pH values fall within 0.5 standard units (s.u.) of the permit limitations. A review of the facility's discharge monitoring data (included in Attachment E) indicates 34 instances in which the reported minimum pH was less than or equal to 6.5 s.u. Therefore, the monitoring frequency for this parameter has not been reduced below the baseline (1 per Day).

- Total Suspended Solids (TSS): Technology-based TSS limitations have been included in the 2012 permit in accordance with the Federal Secondary Treatment Standards. As a result, an alternate TSS monitoring frequency of once per month has been included in the 2012 permit in lieu of the baseline (5 Days per Week) in accordance with Table 4, Section MN-2 of GM 10-2003. Consequently, a reduced monitoring evaluation has not been performed for this parameter.

- Total Residual Chlorine (TRC): According to GM 10-2003, disinfection and dechlorination parameters are not eligible for reduced monitoring to ensure protection of aquatic life and human health. Therefore, the monitoring frequencies for these parameters have not been reduced below baselines (1 per 2 Hours – TRC Final Effluent, 1 per 2 Hours – TRC Contact Tank).

- Dissolved Oxygen (DO): According to GM 10-2003, reduced DO monitoring should not be allowed where minimum DO values fall within 0.5 mg/L of the permit limitation for passive post-aeration systems. A review of the facility's discharge monitoring data indicates that this parameter may potentially qualify for reduced monitoring, and the baseline DO monitoring frequency is once per day. Dissolved oxygen measurements are critical for ensuring efficient wastewater treatment plant operation; therefore, the monitoring frequency for this parameter has not been reduced below the baseline using best engineering judgment.

- Total Phosphorus (TP): Since this facility is currently registered for coverage under the Nutrient (Watershed) General Permit, 9VAC25-820-10 et seq., the TP monitoring and reporting requirements have been reduced from once per week (baseline) to twice per month in accordance with current agency guidance. A reduced monitoring evaluation has not been performed for this parameter.

- Ammonia as Nitrogen: A reduced monitoring evaluation was performed for this parameter in accordance with Section MN-2 of GM 10-2003; see below. For conservative purposes, the most stringent monthly average ammonia as nitrogen (June – October) limitation was utilized for this evaluation. The monitoring frequency for this parameter has been reduced from five (5) days per week (baseline) to one (1) day per week.

- *E. coli*: According to GM 10-2003, facilities should generate at least three (3) years of effluent data before consideration of reduced effluent monitoring. To date, this facility has generated approximately two (2) years of effluent monitoring data for *E. coli*. Therefore, a reduced monitoring evaluation has not been performed for this parameter.

- $cBOD_5$: A reduced monitoring evaluation was performed for this parameter in accordance with Section MN-2 of GM 10-2003; see below. The monitoring frequency for this parameter has been reduced from five (5) days per week to two (2) days per week.

- If the facility is issued a Notice of Violation (NOV) for any of the parameters listed below, then all of the following effluent monitoring frequencies shall become effective upon written notice from DEQ and shall remain in effect until permit expiration.

Effluent Parameter	Monitoring Frequency (Baseline)
$cBOD_5$	5 Days per Week
Ammonia as N (November – May)	5 Days per Week
Ammonia as N (June – October)	5 Days per Week

- In accordance with the VPDES Permit Manual, SCWWA's qualification for consideration of reduced monitoring requirements will be re-evaluated with the next permit reissuance. If the facility does not qualify for consideration, then the reduced monitoring frequencies may potentially revert back to the baseline monitoring frequencies.

Parameter -->	Ammonia as N

Enter Data Below	
Current Monthly Average Concentration Limit (mg/L)	**Current Monitoring Frequency (Use the format "#/wk" or "#/month")**
4.17	5/wk

DMR Due Date (optional)	Monthly Average Concentration (mg/L)
6/10/2008	0.05
7/10/2008	0.04
8/10/2008	0.2
9/10/2008	0.03
10/10/2008	0.2
11/10/2008	0.03
12/10/2008	0.06
1/10/2009	0.12
2/10/2009	0.07
3/10/2009	0.23
4/10/2009	0.07
5/10/2009	0.16
6/10/2009	0.2
7/10/2009	0.2
8/10/2009	0.2
9/10/2009	0.2
10/10/2009	0.03
11/10/2009	0.2
12/10/2009	0.07
1/10/2010	0.06
2/10/2010	0.05
3/10/2010	0.56
4/10/2010	0.07
5/10/2010	0.18
6/10/2010	0.2
7/10/2010	0.2
8/10/2010	0.02
9/10/2010	0.2
10/10/2010	0.06
11/10/2010	0.2
12/10/2010	0.07
1/10/2011	0.03
2/10/2011	0.2
3/10/2011	0.02
4/10/2011	0.02
5/10/2011	0.05

Results

Data Average	Ratio of Long Term Average to Monthly Average Limit (%)	**Allowed Reduction**
0.126388889	3.0	**1/week**

Table 1. Ratio of Long Term Average to Monthly Average Limit

Baseline Monitoring	75-66%	65-50%	49-25%	<25%
7/wk	5/wk	4/wk	3/wk	1/wk
6/wk	4/wk	3/wk	2/wk	1/wk
5/wk	4/wk	3/wk	2/wk	1/wk
4/wk	3/wk	2/wk	1/wk	1/wk
3/wk	3/wk	2/wk	1/wk	1/wk
2/wk	2/wk	1/wk	2/mo	1/mo
1/wk	1/wk	1/wk	2/mo	1/2mos
2/month	2/mo	2/mo	2/mo	1/quarter
1/month	1/mo	1/mo	1/quarter	1/6mos

The baseline monitoring frequencies in Table 1 will normally be considered the level of monitoring in the existing effective VPDES permit. It is important to recognize that permittees who receive monitoring frequency reductions in accordance with Table 1 are still expected to take all appropriate measures to control both the average level of pollutants of concern in their discharge (mean) as well as the variability of such parameters in the discharge (variance), regardless of any reductions in monitoring frequencies granted from the baseline levels. Data collected on a quarterly basis is not included in the baseline frequencies because it is not frequent enough to develop valid reduced monitoring statistics.

Parameter -->	cBOD5

Enter Data Below	
Current Monthly Average Concentration Limit (mg/L)	**Current Monitoring Frequency (Use the format "#/wk" or "#/month")**
15	5/wk

DMR Due Date (optional)	Monthly Average Concentration (mg/L)
6/10/2008	5
7/10/2008	5
8/10/2008	5
9/10/2008	5
10/10/2008	5
11/10/2008	5
12/10/2008	5
1/10/2009	5
2/10/2009	5
3/10/2009	5
4/10/2009	5
5/10/2009	0
6/10/2009	1
7/10/2009	5
8/10/2009	5
9/10/2009	5
10/10/2009	5
11/10/2009	5
12/10/2009	1
1/10/2010	2
2/10/2010	0
3/10/2010	5
4/10/2010	5
5/10/2010	5
6/10/2010	5
7/10/2010	5
8/10/2010	5
9/10/2010	5
10/10/2010	5
11/10/2010	5
12/10/2010	5
1/10/2011	5
2/10/2011	5
3/10/2011	5
4/10/2011	5
5/10/2011	5

Results

Data Average	Ratio of Long Term Average to Monthly Average Limit (%)	**Allowed Reduction**
4.416666667	29.4	**2/week**

Table 1. Ratio of Long Term Average to Monthly Average Limit

Baseline Monitoring	75-66%	65-50%	49-25%	<25%
7/wk	5/wk	4/wk	3/wk	1/wk
6/wk	4/wk	3/wk	2/wk	1/wk
5/wk	4/wk	3/wk	2/wk	1/wk
4/wk	3/wk	2/wk	1/wk	1/wk
3/wk	3/wk	2/wk	1/wk	1/wk
2/wk	2/wk	1/wk	2/mo	1/mo
1/wk	1/wk	1/wk	2/mo	1/2mos
2/month	2/mo	2/mo	2/mo	1/quarter
1/month	1/mo	1/mo	1/quarter	1/6mos

The baseline monitoring frequencies in Table 1 will normally be considered the level of monitoring in the existing effective VPDES permit. It is important to recognize that permittees who receive monitoring frequency reductions in accordance with Table 1 are still expected to take all appropriate measures to control both the average level of pollutants of concern in their discharge (mean) as well as the variability of such parameters in the discharge (variance), regardless of any reductions in monitoring frequencies granted from the baseline levels. Data collected on a quarterly basis is not included in the baseline frequencies because it is not frequent enough to develop valid reduced monitoring statistics.

Attachment M

Owner Comments & DEQ Staff Responses

900 Magazine Rd.
Petersburg, VA 23803
Office: (804) 861-0111
Fax: (804) 861-3254

April 20, 2012

By Email

Drew Hammond
Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
andrew.hammond@deq.virginia.gov

Re: VPDES Permit

Dear Mr. Hammond:

Per our discussion last week, I offer the following overview of our issues with the draft permit obtained from DEQ's FTP site and referenced in your March 22, 2012 email.

Issue #1 – Elimination of reduced monitoring for cBOD and Ammonia

It is my understanding that this is being done because of NOV's for the City of Petersburg and that DEQ guidance now provides that any NOV's within the service area dictate a resumption of increased monitoring. I must object to this as we do not control the collection systems of any of the five (5) jurisdictions that we service. In addition, overflows in the collection system do not impact the wastewater plant's cBOD or Ammonia results in any way and our cBOD and Ammonia results are far flow our permit limits. The imposition of increased monitoring will not increase or motivate compliance in the collections systems and will serve only to increase costs for SCWWA without improving water quality. We therefore request that our monitoring requirements be restored to 3 days/week for these parameters. However, if DEQ is unwilling to grant this request, please provide me with the specific section and page numbers in GM 10-2003 that are the basis for the increased monitoring requirements. GM 10-2003 is cited in the fact sheet as the rationale for these changes. As you know, GM 10-2003 is 530 pages long so it is very difficult to identify with certainty the section or sections relied on by DEQ.

Issue #2 – Lowered Ammonia and TRC limits

Per our discussions last week, I understand that the lowering of Ammonia and TRC limits is being driven by statistical analysis mandated by EPA. We would like a further explanation of the reasoning behind this and how the statistical analysis is driving lower limits.

Issue #3 – Phosphorus reporting limits

Although the fact sheet cites GM 06-2016 (Significant Figures for Discharge Monitoring Reports) as the rationale for changing the limit for TP from 2.00 mg/l to 2.0 mg/l, we ask that you provide further explanation and justification for this change. .

Issue #4 – Whole Effluent Toxicity Testing

Per our discussion last week, I understand that upon provision of additional data from prior years, further analysis will be done to determine if a WET limit is needed. This data was provided via e-mail to

you on April 10th. I would also question that, even if a limit is needed, that we be allowed to continue annual monitoring. We were removed from quarterly monitoring in the past and no substantive changes in treatment or inflow characteristics have occurred that indicate the need for increased monitoring. It appears that the need to resume quarterly testing is only driven by the imposition of a limit. Given the substantial cost impact (about $2000 per test, which would equate to about $6000 more a year) and the limited impact on water quality, we request that the monitoring frequency be restored to annual.

Also, it appears that, on Attachment J of the Fact Sheet, on page 3 of the "Spreadsheet for Determination of WET test endpoints or WET limits", that the dilution series based on mean data in Table 4 is calculated incorrectly. The average of the 5 data points in Table 3 is actually 68.6, not the 64 used in Table 3. Please reconcile this apparent discrepancy.

Issue #5 – cBOD Quantification Limit

The QL listed on page 7 of 15 of the permit is 2.0 mg/l. Our previous permit QL was 5.0 mg/l. Please provide the rationale or method reference for this change.

Issue #6 – SNC Publication Deadline

The draft permit has no required publication data for industries in SNC. Our previous permit had a deadline of March 31st of the year following the SNC occurrence. Is DEQ proposing to eliminate a specific deadline for these publications? If so, will these be handled outside the permit itself (i.e, directly by the permit writer or the pretreatment coordinator)?

Issue #7 – Use of Averaged Results

Please reconcile the reporting instructions in Part II that are in conflict with those provided by the VELAP Certification committee in regards to the practice of reporting averaged results from multiple runs on the same sample. Attached is a communication from Joe Garmin of DCLS regarding this matter.

Given the number of issues raised, I am requesting an extension to the draft permit comment period to May 11th. I would also like to schedule a meeting be scheduled to go over these issues before we complete our review and comments on the draft permit. Please let me know your availability for a meeting during the next two weeks. We will be glad to meet at your office if that will facilitate scheduling a meeting sooner rather than later.

I look forward to hearing from you at the earliest opportunity. You can reach me at (804) 590-1145 x11 or (804) 861-0111 x202. I may also be reached by e-mail at aharrison@scwwa.org.

Sincerely,

L. Alan Harrison, P.E.
Interim Executive Director

Cc: Christina Stokes, Lab Manager
Ray Burpoe, Operations Manager

900 Magazine Rd.
Petersburg, VA 23803
Office: (804) 861-0111
Fax: (804) 861-3254

May 17, 2012

By Email

Drew Hammond
Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
andrew.hammond@deq.virginia.gov

Re: VPDES Permit

Dear Mr. Hammond:

Many thanks to you for taking the time to meet with us last week regarding the issues raised in our April 20th letter. Based on the discussions at the meeting, I offer the following comments regarding our understanding of the resolution of these matters. The original issues raised are in italics with the summary of our understanding below each of these. Please let me know if, in your opinion, anything here is error.

Issue #1 – Elimination of reduced monitoring for cBOD and Ammonia

It is my understanding that this is being done because of NOV's for the City of Petersburg and that DEQ guidance now provides that any NOV's within the service area dictate a resumption of increased monitoring. I must object to this as we do not control the collection systems of any of the five (5) jurisdictions that we service. In addition, overflows in the collection system do not impact the wastewater plant's cBOD or Ammonia results in any way and our cBOD and Ammonia results are far flow our permit limits. The imposition of increased monitoring will not increase or motivate compliance in the collections systems and will serve only to increase costs for SCWWA without improving water quality. We therefore request that our monitoring requirements be restored to 3 days/week for these parameters. However, if DEQ is unwilling to grant this request, please provide me with the specific section and page numbers in GM 10-2003 that are the basis for the increased monitoring requirements. GM 10-2003 is cited in the fact sheet as the rationale for these changes. As you know, GM 10-2003 is 530 pages long so it is very difficult to identify with certainty the section or sections relied on by DEQ.

DEQ will not modify the requirement for increased monitoring. We will be pursuing this matter further with Central Office and may wish to have another meeting on this item.

Issue #2 – Lowered Ammonia and TRC limits

Per our discussions last week, I understand that the lowering of Ammonia and TRC limits is being driven by statistical analysis mandated by EPA. We would like a further explanation of the reasoning behind this and how the statistical analysis is driving lower limits.

Our understanding is the baseline monitoring frequency of 5 days per week was not used in previous permit cycles as our sampling frequency was set at 3 days per week and this number of samples was used in the statistical analysis. It is also our understanding that the nature of the statistical analysis results in lower limits when using more frequent monitoring in the analysis. Per Curt, the limits in

past cycles should have been set using a sampling frequency of 5 days per week even with reduced monitoring. Consequently, the position of DEQ is that these limits would have been lowered irrespective of the monitoring frequency.

Issue #3 – Phosphorus reporting limits

Although the fact sheet cites GM 06-2016 (Significant Figures for Discharge Monitoring Reports) as the rationale for changing the limit for TP from 2.00 mg/l to 2.0 mg/l, we ask that you provide further explanation and justification for this change.

This matter is resolved per our discussion during the meeting.

Issue #4 – Whole Effluent Toxicity Testing

Per our discussion last week, I understand that upon provision of additional data from prior years, further analysis will be done to determine if a WET limit is needed. This data was provided via e-mail to you on April 10th. I would also question that, even if a limit is needed, that we be allowed to continue annual monitoring. We were removed from quarterly monitoring in the past and no substantive changes in treatment or inflow characteristics have occurred that indicate the need for increased monitoring. It appears that the need to resume quarterly testing is only driven by the imposition of a limit. Given the substantial cost impact (about $2000 per test, which would equate to about $6000 more a year) and the limited impact on water quality, we request that the monitoring frequency be restored to annual.

Also, it appears that, on Attachment J of the Fact Sheet, on page 3 of the "Spreadsheet for Determination of WET test endpoints or WET limits", that the dilution series based on mean data in Table 4 is calculated incorrectly. The average of the 5 data points in Table 3 is actually 68.6, not the 64 used in Table 3. Please reconcile this apparent discrepancy.

Based on Drew's analysis, even using our past data prior to the current permit cycle still requires us to have a WET limit and quarterly monitoring. We understand that, at our option, we can have the test run at additional dilutions, beyond those specified in the permit, and that this data may affect our future statistical analysis in a manner to reduce our monitoring frequency again. Drew indicated that he would discuss this matter with Deborah Debiassi to ascertain if we can get back to annual monitoring even with a permit limit in place. Drew sent an e-mail on May 15th that reads:

> "As requested, I have taken a further look into SCWWA's proposed whole effluent toxicity limitation (1 per 3 Months monitoring frequency) with regards to potential reduced effluent monitoring at subsequent permit reissuances. According to the current reduced monitoring frequency guidance (GM 10-2003, Section MN-2, Page 3), data collected on a quarterly basis is not frequent enough to develop valid reduced monitoring statistics for evaluation. Therefore, it would appear as though the proposed 1 per 3 Months monitoring frequency would be established as the monitoring baseline and that baseline would potentially not be eligible for reduction at subsequent reissuances".

Upon our response expressing concern with the rationale, Drew sent another e-mail on May 16th that reads:

> "Please note that there is a distinction between reduced monitoring frequencies associated with permit limitations and reduced monitoring frequencies associated with monitored only parameters (i.e. effluent parameters which are monitored but have no limitation established). More specifically:
>
> 1. For effluent parameters with established permit limitations, a reduced monitoring evaluation includes the calculation of a 3-year composite average utilizing compliance (i.e. DMR) data. Next, the ratio of this composite average divided by the permit limitation is determined on a percentage basis. The resulting

percentage provides the potential monitoring frequency reduction in accordance with GM 10-2003, Section MN-2, Page 3 (Allowable Monitoring Frequency Reduction Based on Actual Performance Percentage of Permit Limit – table). As noted yesterday and on page 3 of GM 10-2003, Section MN-2, data collected on a quarterly basis is not frequent enough to develop valid reduced monitoring statistics for evaluation. Additionally, as stated on page 4 of GM 10-2003, Section MN-2, "EPA guidance does not advocate any reductions for parameters that are currently monitored only once/quarter."

Based upon the procedure detailed above, a reduced monitoring frequency of once per year is currently not an option in the "Allowable Monitoring Frequency Reduction Based on Actual Performance Percentage of Permit Limit" table.

2. For monitored only effluent parameters (i.e. no established permit limitations), the permit writer, at his or her discretion and with the concurrence of management, may potentially reduce the monitoring frequency for effluent parameters with no established permit limitations. These reductions are generally considered acceptable when no reasonable potential to violate water quality standards exists.

It appears as though this process was previously employed to reduce SCWWA's WET monitoring from once per quarter to once per year. Please note that the 2006 permit included a WET testing endpoint for future reasonable potential analyses and not a WET limitation. However, based upon current effluent WET data, a reasonable potential appears to exist and statistical effluent limitations have been included in the draft 2012 permit."

While Drew's emails correctly cite the reduced monitoring frequency guidance, we remain very concerned about DEQ's application of the guidance. Since it appears that DEQ is unwilling to depart from the guidance, we wish to know how much data and at what frequency of monitoring would be required to remove the WET limit during the next permit and move us back to annual monitoring. We may wish to have another meeting on this item.

Issue #5 – cBOD Quantification Limit

The QL listed on page 7 of 15 of the permit is 2.0 mg/l. Our previous permit QL was 5.0 mg/l. Please provide the rationale or method reference for this change.

This matter is resolved per our discussion during the meeting.

Issue #6 – SNC Publication Deadline

The draft permit has no required publication data for industries in SNC. Our previous permit had a deadline of March 31st of the year following the SNC occurrence. Is DEQ proposing to eliminate a specific deadline for these publications? If so, will these be handled outside the permit itself (i.e, directly by the permit writer or the pretreatment coordinator)?

This matter is resolved per our discussion during the meeting.

Issue #7 – Use of Averaged Results

Please reconcile the reporting instructions in Part II that are in conflict with those provided by the VELAP Certification committee in regards to the practice of reporting averaged results from multiple runs on the same sample. Attached is a communication from Joe Garmin of DCLS regarding this matter.

This matter is resolved per our discussion during the meeting.

Given the remaining issues regarding Items 1 and 4, we request that the forwarding of the draft permit to EPA be deferred until we have opportunity to explore these further.

Please let me know as soon as possible if these are correct. I look forward to hearing from you at the earliest opportunity. You can reach me at (804) 590-1145 x11 or (804) 861-0111 x202. I may also be reached by e-mail at aharrison@scwwa.org

Sincerely,

L. Alan Harrison, P.E.
Interim Executive Director

Cc: Kyle Winter, DEQ
Curt Linderman, DEQ
Christina Stokes, Lab Manager
Ray Burpoe, Operations Manager
Herbert White, WW Associates
David Evans, McGuireWoods

900 Magazine Rd.
Petersburg, VA 23803
Office: (804) 861-0111
Fax: (804) 861-3254

June 13, 2012

By Email

Drew Hammond
Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
andrew.hammond@deq.virginia.gov

Re: VPDES Permit

Dear Mr. Hammond:

As you may know, following our meeting last month, Dave Evans spoke with Fred Cunningham regarding DEQ's proposal to eliminate reduced monitoring for cBOD and Ammonia during the next permit cycle in reliance on Section MN-2 of Guidance Memo 10-2003, which provides, in relevant part, as follows:

> *The ban on monitoring reductions applies if any part of the sewerage system, including another outfall at the treatment plant or collection lines owned by another person, have been subject to enforcement action in the past 3 years. (Emphasis added).*

DEQ's proposal to eliminate reduced monitoring is based on an October 8, 2010 Notice of Violation (NOV) issued to the City of Petersburg (City) for six SSOs that occurred from the City's collection system during the period from April 5, 2010 to October 1, 2010.[1]

I understand from Mr. Evans that Mr. Cunningham has agreed that DEQ will consider departing from the guidance and retaining the reduced monitoring during the next permit cycle if the Authority can show that the SSOs in question were entirely unrelated to the Authority's operations and facilities and occurred as a result of factors entirely beyond the Authority's control. Accordingly, we have reviewed the October 8, 2010 NOV issued to the City, the City's November 4, 2010 response to the NOV, and our data and records from the time periods when the SSOs occurred. A copy of the City's response is attached for your convenience. Based on our review, we believe it is indisputable that the SSOs in question were entirely unrelated to the Authority's facilities and operations and occurred as a result of factors entirely beyond the Authority's control. The following is a summary of the relevant facts.

Of the events cited, the following were due to mechanical failures or system line blockages that occurred entirely within the City's collection system:

- Observation 1: 5/5/2010 – Approximately 700 gallons discharged due to a grease line stoppage entirely within the City's collection system and unrelated to the Authority's facilities or operations.

[1] The NOV lists seven SSOs, but the City's response indicates that one of the SSOs actually occurred in Chesterfield County.

- Observation 5: 6/2/2010 – Approximately 200 gallons discharged due to a battery backup failure entirely within the City's collection system and unrelated to the Authority's facilities or operations.

The following were due to a combination of flows and mechanical failures that occurred entirely within the City's collection system:

- Observation 3: 5/23/2010 – Unlisted volumes discharged at the City's Main pump station due to pump failure – Our data show that during this event, SCWWA treated all of the peak hourly flows conveyed to the treatment plant without any spills or violations.
- Observation 4: 6/1/2010 - Unlisted volumes discharged at the City's Main pump station due to pump failure – Our data show that during this event, SCWWA treated all of the peak hourly flows conveyed to the treatment plant without any spills or violations.

The following were due to flows:

- Observations 6 & 7: 10/1/2010 – Unlisted volumes discharged at the City's Poor Creek pump station. – These discharges occurred following an extraordinary rainfall event; 6.36" of rain on September 29th (4.95") and 30th (1.41") as measured at our on-site gauge from Tropical Storm Nicole. Our data show that during this event, SCWWA treated all of the peak hourly flows conveyed to the treatment plant without any spills or violations.

Based on the above, we renew our request to maintain our existing monitoring frequency of 3 days a week for cBOD and Ammonia. I look forward to hearing from you at the earliest opportunity in regards to this request. You can reach me at (804) 590-1145 x11 or (804) 861-0111 x202. I may also be reached by e-mail at aharrison@scwwa.org.

Sincerely,

L. Alan Harrison, P.E.
Interim Executive Director

Cc: Fred Cunningham, DEQ
Kyle Winter, DEQ
Curt Linderman, DEQ
Christina Stokes, Lab Manager
Ray Burpoe, Operations Manager
Herbert White, WW Associates
David Evans, McGuireWoods

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
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Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

June 22, 2012

Mr. L. Alan Harrison, P.E., Interim Executive Director
South Central Wastewater Authority
900 Magazine Road
Petersburg, Virginia 23083
Via E-Mail: aharrison@scwwa.org

Re: South Central Wastewater Authority
VPDES Permit No. VA0025437
Response to Owner Comments

Dear Mr. Harrison:

The staff of Virginia's Department of Environmental Quality (DEQ) has reviewed your comments received April 20, 2012, May 17, 2012, and June 13, 2012, in regards to draft Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0025437. Staff offers the following responses to the outstanding issues identified in the aforementioned comment letters:

Issue #1 – Reduced Effluent Monitoring

In response to your letter dated June 13, 2012, DEQ staff believes that South Central Wastewater Authority (SCWWA) potentially qualifies for consideration of reduced effluent monitoring utilizing best engineering judgment. Therefore, a reduced monitoring evaluation was performed in accordance with current agency guidance; see Attachment L of the fact sheet. As a result of this evaluation, the monitoring frequencies for Ammonia as Nitrogen and $cBOD_5$ have been reduced for the existing facility.

Issue #4 – Whole Effluent Toxicity Testing

As discussed via telephone, agency guidance does not currently exist for evaluating whole effluent toxicity (WET) with regards to reduced effluent monitoring. Therefore, DEQ staff is currently unable to provide specific WET testing endpoints and/or monitoring frequencies that would potentially result in reduced effluent monitoring for future permit reissuances. However, a schedule of compliance has been included in the draft permit to provide SCWWA with an opportunity to perform toxicity reduction evaluations prior to the WET limitation becoming effective.

This letter is not a final determination or case decision under the Administrative Process Act. If you would like to discuss the information contained in this letter, please contact me at (804) 527-5048. In the event that discussions with staff do not lead to a satisfactory resolution of the contents of this letter, you may elect to participate in DEQ's Process for Early Dispute Resolution. For information on the Process for Early Dispute Resolution, please visit the following address:

http://townhall.virginia.gov/L/GetFile.cfm?File=E:\townhall\docroot\GuidanceDocs\440\GDoc_DEQ_2672_v1.pdf

I plan on forwarding the draft permit package to the U.S. Environmental Protection Agency no later than **June 29, 2012**, for their review and comment. Please feel free to contact me at (804) 527-5048 or Andrew.Hammond@deq.virginia.gov if you have any questions about this letter.

Respectfully,

Andrew J. Hammond II, P.E., H.I.T.
Water Permit Writer

Enc: Draft Permit Package (Revised)

Cc: Emilee Adamson, DEQ-PRO

Hammond, Andrew (DEQ)

From: Alan Harrison [aharrison@scwwa.org]
Sent: Monday, June 25, 2012 1:53 PM
To: Hammond, Andrew (DEQ)
Cc: Adamson, Emilee (DEQ); Christina Stokes; Raymond Burpoe; Dave Evans (devans@mcguirewoods.com)
Subject: RE: VA0025437 - South Central Wastewater Authority - REVISED Draft VPDES Permit

Drew,

I don't believe that the guidance should be applied in this case because:

1) The ammonia & cBOD limits will not be changed as a result of the upgrade, and;
2) The upgrade is for nutrient removal and plant performance will only improve once the upgrade is in operation.

L. Alan Harrison, P.E.
Assistant Executive Director
South Central Wastewater Authority
900 Magazine Rd.
Petersburg, VA 23803
(O) (804) 861-0111 x202
(F) (804) 861-3254
aharrison@scwwa.org

From: Hammond, Andrew (DEQ) [mailto:Andrew.Hammond@deq.virginia.gov]
Sent: Friday, June 22, 2012 12:20 PM
To: Alan Harrison
Cc: Adamson, Emilee (DEQ); Christina Stokes; Raymond Burpoe; Dave Evans (devans@mcguirewoods.com)
Subject: RE: VA0025437 - South Central Wastewater Authority - REVISED Draft VPDES Permit

Alan,

According to Section MN-2 of the 2010/2011 VPDES Permit Manual (GM 10-2003), new and/or upgraded facilities should generate at least three (3) years of effluent data before consideration of reduced effluent monitoring. Effluent data from an existing facility is typically not utilized to calculate the long term averages for an upgraded facility (due to potential changes in treatment technologies, wastewater effluent characteristics, etc.). As a result, the reduced monitoring evaluation has been performed for the existing facility only.

The 2010 permit modification inadvertently established ammonia and cBOD monitoring frequencies equal to the reduced monitoring frequencies for the existing facility instead of the baseline (5 days per week) monitoring frequencies. The 2012 draft permit has corrected this oversight, and the changes have been discussed in Item 16 of the fact sheet.

Thanks,
Drew

Andrew J. Hammond II, P.E., H.I.T.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph: 804.527.5048
Fx: 804.527.5106
Andrew.Hammond@deq.virginia.gov

This email should not be considered a legal opinion or case decision as defined by the Administrative Process Act, Code of Virginia § 2.2-4000 *et seq*.

From: Alan Harrison [mailto:aharrison@scwwa.org]
Sent: Friday, June 22, 2012 11:57 AM
To: Hammond, Andrew (DEQ)
Cc: Adamson, Emilee (DEQ); Christina Stokes; Raymond Burpoe; Dave Evans (devans@mcguirewoods.com)
Subject: RE: VA0025437 - South Central Wastewater Authority - REVISED Draft VPDES Permit

Drew,

Just starting to look at this, but one think I noticed on the cBOD and Ammonia. For the sampling frequency after the install of any nutrient removal, shouldn't the ammonia and cBOD sampling frequencies be the same as for before nutrient removal installation? As drafted, they say 5 days/wk.

L. Alan Harrison, P.E.
Assistant Executive Director
South Central Wastewater Authority
900 Magazine Rd.
Petersburg, VA 23803
(O) (804) 861-0111 x202
(F) (804) 861-3254
aharrison@scwwa.org

From: Hammond, Andrew (DEQ) [mailto:Andrew.Hammond@deq.virginia.gov]
Sent: Friday, June 22, 2012 11:19 AM
To: Alan Harrison
Cc: Adamson, Emilee (DEQ); Christina Stokes; Raymond Burpoe
Subject: VA0025437 - South Central Wastewater Authority - REVISED Draft VPDES Permit

Good morning, Alan,

Please find attached DEQ staff's response to the outstanding owner comments regarding South Central Wastewater Authority's draft VPDES permit (Permit No. VA0025437). A copy of the revised draft permit package can be obtained from DEQ's FTP site at the following address: ftp://ftp.deq.virginia.gov/wps/PERMIT/PRO/VA0025437/. Please contact me if you have trouble accessing the documents.

As noted in the attached response, I plan on forwarding the draft permit package to EPA no later than June 29, 2012, for their review and concurrence. Please feel free to contact me if you have questions concerning the draft permit package.

Due to my pending transfer to DEQ Central Office (7/10/2012), Emilee Carpenter Adamson has graciously accepted the responsibility of responding to public comments and processing the final permit package. I have the utmost confidence in Emilee's ability to address any public comments/concerns if they arise. The public notice and fact sheet have been updated to include Emilee's contact information for public inquiry purposes.

Thank you,
Drew

Andrew J. Hammond II, P.E., H.I.T.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph: 804.527.5048
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Andrew.Hammond@deq.virginia.gov